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ANNEX

THE

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1877-78

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CONTENTS.

THE CALENDAR.

1877	Sept. 18	Fall Term.
September 18	Tuesday	Entrance Examinations.
September 19	Wednesday	Entrance Examinations continued.
September 20	Thursday	REGISTRATION for the Term.
September 21	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 17	Monday	Term Examinations begin.
December 21	Friday	Term ends.
1878	**Jan. 8**	**Winter Term.**
January 8	Tuesday	Entrance Examinations.
January 9	Wednesday	Entrance Examinations continued.
January 10	Thursday	REGISTRATION for the Term.
January 11	Friday	Instruction begins.
January 11	Friday	FOUNDER'S DAY,
February 22	Friday	WASHINGTON'S BIRTHDAY.
March 25	Monday	Term Examinations begin.
March 29	Friday	Term ends.

1878 Apr. 6 Spring Term.

April	6	Saturday	REGISTRATION for the Term.
April	8	Monday	Instruction begins.
May	3	Friday	Woodford Prize Competition.
May	20	Monday	Commencement Essays handed in.
May	30	Thursday	DECORATION DAY.
June	3	Monday	Senior Examinations begin.
June	4	Tuesday	Examinations for Second Degrees.
June	10	Monday	Term Examinations begin.
June	15	Saturday	Term Examinations end.
June	17	Monday	Entrance Examinations begin.
June	18	Tuesday	Class Day. Annual Meeting of the Trustees.
June	19	Wednesday	Alumni Day.
June	20	Thursday	ANNUAL COMMENCEMENT.

1878 Sept. 17 Fall Term.

September	17	Tuesday	Entrance Examinations.
September	18	Wednesday	Entrance Examinations continued.
September	19	Thursday	REGISTRATION for the Term.
September	20	Friday	Instruction begins.

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SIBLEY *Professor of Mechanical Engineering and Machine Construction.*

T. FREDERICK CRANE, M.A., University Avenue.
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ZIBA HAZARD POTTER, M.A., M.D., LL.B., 137 Cascadilla.
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Non-Resident Professor of German Literature.

FREDERICK L. O. RŒHRIG, PH.D., M.D., Pughtown Road.
Professor of Sanscrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, M.A., University Hill.
Professor of Anglo-Saxon and English Literature.

WATERMAN T. HEWETT, M.A., [Absent in Europe.]
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Professor of Architecture.

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Professor of Physics and Experimental Mechanics.

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Master Mechanic and Director of the Machine Shop in the Sibley College.

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SIMON H. GAGE, B.S.,
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FRANK B. HINE, B.S.,
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EDWARD P. JENNINGS, C.E.,
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WILLIAM R. LAZENBY, AG.B.,
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Natural History.

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GAGE, SIMON HENRY, B.S., Cornell University
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History and Political Science.

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MEAD, THEODORE LUQUEER, B.C.E., Cornell University
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VOLKMAN, A. L. K., Arch.B., Cornell University
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WILLMARTH, CHARLES HENRY, M.S., Cornell University
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WILSON, CHARLES FORSYTH, Ph.B., Cornell University
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WOOD, THOMAS D., Ph. B., Western University of Pa.
Mechanic Arts.

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IN THE FOURTH YEAR OR SENIOR STUDIES.

Ames, Charles Wilberforce,	Germantown, Pa.,	*Literature*
Babcock, John Wesley,	Jamestown,	*Arts*
Baker, Eugene,	Ithaca,	*Science and Letters*
Baker, Fred,	Norwalk, O.,	*Natural History*
Ballard, Alfred Hovey,	Syracuse,	*Science and Letters*

Ballard, Samuel Thruston,	Louisville, Ky.,	*Science and Letters*
Barnard, Philip,	Lake View, Ill.,	*Science and Lettters*
Beahan, Willard,	Watkins,	*Engineering*
Beardsley, Arthur Eugene,	Cayuga, Ill.,	*Natural History*
Bissell, Frank Edward,	South Bend, Ind.,	*Engineering*
Blowers, Clarence Newman,	Syracuse,	*Science and Letters*
Borden, James McKee,	Washington, D. C.,	*Mechanic Arts*
Breed, William Bradley,	Phoenix,	*Chem. and Physics*
Bruen, Frank,	Dayton, O.,	*Engineering*
Burdsall, Ellwood,	Port Chester,	*Mechanic Arts*
Cady, Daniel Wayland,	Peterborough,	*Arts*
Cary, Eugene,	Dunkirk,	*Science and Letters*
Cole, Willoughby,	San Francisco, Cal.,	*Optional*
~~Conant, Hey~~wood,	Wilmington, Del.,	*Science and Letters*
Crandall, Clayton,	Ithaca,	*Chem. and Physics*
De Witt, Bessie Bell,	Owego,	*Arts*
Dyson, James,	New Britain, Ct.,	*Engineering*
Eaton, George Penston,	Oxford,	*Science and Letters*
Everson, Charles Brown,	Syracuse,	*Science and Letters*
Falkeneau, Arthur,	New York City,	*Mechanic Arts*
Gottheil, William Samuel,	New York City,	*Natural History, Opt.*
Green, Edward,	Utica,	*Architecture*
Halsey, Frederic Arthur,	Unadilla,	*Mechanic Arts*
Heermans, Forbes,	Syracuse,	*Mechanic Arts*
Hill, John Thomas,	Warren, Pa.,	*Mechanic Arts*
Jarvis, George Milton,	Canastota,	*Engineering*
Johnson, Ben,	Ithaca,	*Mechanic Arts*
~~Jones, Lisette Frances~~,	Ilion,	*Science and Letters*
Kasson, Myron Cassius,	Woodstock, Ill.,	*Agriculture*
Keith, William,	Warsaw,	*Chem. and Physics*
Kendall, Franklin Mason,	Attica,	*Science and Letters*
Lehmaier, Jacob Schwartz,	New York City	*Philosophy*
Lewis, John,	Ithaca	*Mechanic Arts*
Mann, Frank Weston,	Norfolk, Mass.	*Science*
Marx, David,	Toledo, O.,	*Engineering*
Maxwell, Frank Adams,	Clymer,	*Engineering*
McCormick, Cyrus Hall,	Henderson, Ky.,	*Engineering*

McEbright, Kit,	Akron, O.,	*Arts, Opt.*
McKay, William Lincoln,	Elmira,	*Arts*
Meeker, Frank Oliver,	Franklin, W. T.,	*Science and Letters*
Mello-Souza, Pedro de,	S. Paulo, Brazil,	*Engineering*
Merrill, Thomas Davis,	Saginaw City, Mich.,	*Engineering*
Monroe, James Smith,	West Milford, N. J.,	*Science & Letters*
Ness, Joseph,	Hoopeston, Ill.,	*Science and Letters*
Oliver, Mary Ellen,	Lynn, Mass.,	*Philosophy*
Pattin, William Bernice,	Fort Plain,	*Science and Letters*
Pickett, William Passmore,	Litchfield, Ct.,	*Science and Letters*
Prado, Bento de Almeida,	Itù S. Paulo, Brazil,	*Agriculture*
Preston, Edward Livermore,	Grinnell, Ia.,	*Engineering*
Putnam, Ruth,	New York City,	*Literature*
Queiroz-Telles, Antonio, neto,	S. Paulo, Brazil,	*Engineering*
Reeves, Arthur Middleton,	Richmond, Ind.,	*Science and Letters*
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Rodriguez, Francisco Valdes,	Havana, Cuba,	*Engineering*
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Sellers, Elias Horning,	Fentonville, Mich.,	*Arts*
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Sweeting, William Hayden,	South Butler,	*Science and Letters*
Thacher, Cornelius Stephen	Hopewell,	*Engineering*
Tibiriça, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Treman, Robert Henry,	Ithaca,	*Mechanic Arts*
Van Norman, Harvey Justin,	Jasper,	*Science and Letters*
Vasconcellós, Augustò Cezar de,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Wakeley, Arthur Cooper,	Omaha, Neb.,	*Literature*
Weed, Watson,	North Rose,	*Science and Letters*
Welker, Philip Albert,	Toledo, O.,	*Engineering*
Wilcox, Wallace Jay,	Ithaca,	*Mechanic Arts*
Wilson, Francis Manly,	Ithaca,	*Optional*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Alberti, William Maxon,	New Market, N. J.,	*Science and Letters*
Bacon, Charles Putnam,	Hartford, Ct.,	*Philosophy*

Bailey, Henry,	Caughdenoy,	*Science and Letters*
Baker, George Titus,	Iowa City, Ia.,	*Engineering*
Bakes, Robert Owen,	Vevay, Ind.,	*Agriculture*
Barros, Francisco Fernando de	S. Paulo, Brazil,	*Engineering*
Benchley, Paul Zeno,	Ithaca,	*Agriculture*
Bissinger, William,	New York City,	*Optional*
Buchman, Albert,	New York City,	*Architecture*
Cane, Abraham,	Plattsburgh,	*Arts*
Chandler, Walter,	Weldon, Ill.,	*Optional*
Conde, Mary Frances,	Amsterdam,	*Literature*
Congdon, Lenore,	Oberlin, O.,	*Optional*
Corbett, Flora Josephine,	Clayville,	*Science and Letters*
Cornish, Albert Judson,	Hamburg, Ia.,	*Optional*
Demorest, Henry Clay,	New York City,	*Science and Letters*
Dewsnap, Samuel Gatfield,	Middletown,	*Chem. and Physics*
Dounce, George Alexander,	Elmira,	*Arts*
Edwards, William Seymour,	Coalburg, W. Va.,	*Science and Letters*
Ferguson, Nicholas Ephraim,	New Milford,	*Engineering*
Fleischman, Adolph,	Albany,	*Architecture*
Fleming, George Claudius,	Ithaca,	*Arts*
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Fuller, Helen Antoinette,	New York City,	*Optional*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature*
Gibson, Stanford Jay,	South New Berlin,	*Science*
Giddings, Lizzie Jane,	Jefferson, O.,	*Science and Letters*
Gifford, Harold,	Milwaukee, Wis.,	*Natural History*
Green, Hattie Lucina,	South Byron,	*Science and Letters*
Gregory, Emily Lovira,	Buffalo,	*Literature, Opt.*
Gregory, Edgar Warren,	Palmyra,	*Engineering*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hamilton, John Foster,	New York City,	*Architecture*
Haskell, Eugene Elwin,	Forestville,	*Engineering*
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Head, Anna Louisa,	Germantown, Pa.,	*Optional*
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Kent, Robert Streator,	Bay Ridge,	*Science and Letters*
Kerr, Walter Craig,	St. Peter, Minn.,	*Mechanic Arts*
King, Franklin Hiram,	Whitewater, Wis.,	*Natural Hist., Opt.*
Knapp, Charles Langdon,	Lowell, Mass.,	*Architecture*
Kozima, Noriyuki,	Tokio, Japan,	*Architecture*
Lowenbein, Ernest,	New York City,	*Architecture*
Lucas, Charles Otho,	Greenville, Ohio,	*Science and Letters*
Macy, Ervin Barnes,	Port Byron,	*Science and Letters*
Magner, Edmund,	Andover,	*Science and Letters*
Marx, Henry,	Toledo, O.,	*Mechanic Arts*
Mersereau, Charles Vernon,	Union,	*Engineering*
Millard, Alfred,	Omaha, Neb.,	*Science and Letters*
Mills, Hattie May,	Syracuse,	*Literature*
Moffat, Edmund Judson,	Chatham,	*Literature*
Montignani, John Ferguson,	Albany,	*Literature*
Morris, David Ellis,	Cincinnati, Ohio,	*Arts*
Morse, Edmund Royce,	Rutland, Vt.	*Science and Letters*
Newton, Whitney,	Denver, Col.,	*Science and Letters*
O'Connell, John Richard,	Barrytown,	*Engineering*
Olmsted, Allen Seymour,	Leroy,	*Optional*
Olney, Willard,	Westernville,	*Engineering*
Page, John,	Stafford,	*Engineering*
Parke, Robert Augustus,	Binghamton,	*Mechanic Arts*
Patten, Elsie Belle Manderville,	Binghamton,	*Literature*
Peck, Lyra Rosalind,	West Bloomfield,	*Science and Letters*
Philipp, William Bernard,	Cincinnati, Ohio,	*Science and Letters*
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Russel, Edward	Ithaca,	*Arts*
Russel, Sarah Jackson,	Ithaca,	*Literature*
Ryder, Clayton,	Carmel,	*Science and Letters*
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Smith, William Joseph,	Charleston,	*Engineering*
Spaulding, Moses Jay,	East Poultney, Vt.,	*Science and Letters*
Suren, Nathan Hagop,	Marash, Asia Minor,	*Mechanic Arts*
Tidball, Walton Caldwell,	Fort Monroe, Va.,	*Chem. and Physics*
Tomkins, Calvin,	Newark, N. J.,	*Science and Letters*
Trueblood, Barclay Tennyson,	Salem, Iowa,	*Chem. and Physics*
Trumbull, Thomas Hooker,	Washington, D. C.,	*Optional*
Van Wormer, Eve Emma,	Glenville,	*Science and Letters*
Warner, James Ward,	Rock Stream,	*Science and Letters*
Washburn, Alfred,	Chappaqua,	*Science and Letters*
Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Science and Letters*
Welles, George Matson,	Elmira,	*Science and Letters*
Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Wilcox, Frank Nelson,	Ithaca,	*Architecture*
Willard, Simon,	Jonesboro, Ill.,	*Natural History, Opt.*
Woodward, Julius Hayden,	Brandon, Vt.,	*Science and Letters*
Wright, Frank Ayres,	Newburgh,	*Architecture*
Young, John Henry Weir,	Cold Spring,	*Natural History*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Adams, Edward Shields,	Chicago, Ill.,	*Optional*
Allison, Charles Rollo,	Oswego,	*Chemistry, Opt.*
Arnold, George,	Rochester,	*Science*
Arrigunaga de, Joaquin Gutierez,	Campeche, Mexico,	*Agriculture*
Atwood, Charles,	Moravia,	*Agriculture*
Atwood, Charles Edwin,	Ithaca,	*Science and Letters*
Ayers, Grover,	Vermont, Ill.,	*Philosophy, Opt.*
Babcock, Charles Edward Payne,	Manlius,	*Mechanic Arts*
Bailey, Leon,	Wellsboro, Pa.,	*Literature*
Baker, William Apollos,	Yaphank,	*Science and Letters*

Barros-Paes, Fernando de,	S. Paulo, Brazil,	*Engineering*
Baxter, Frank Edward,	St. Louis, Mo.,	*Engineering*
Beckwith, John Dorr,	Cedarville,	*Science and Letters*
Benham, George Washington,	Norwalk, O.,	*Science and Letters*
Bird, William Noble Davis,	Ithaca,	*Agriculture*
Bissell, Esse Clarissa,	South Bend, Ind.,	*Science and Letters*
Bliss, Henry Dwight,	Holley,	*Agriculture*
Boyer, Arthur Grindage,	Aurora,	*Agriculture, Opt.*
Bradley, Willis Clifford,	Cedar Rapids, Iowa,	*Science & Letters*
Brown, Henry Kirk,	Syracuse,	*Science and Letters*
Buck, Helen Albertian,	Watkins,	*Science and Letters*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Nat. Hist., Opt.*
Carpenter, George,	Utica,	*Natural History, Opt.*
Carpenter, William Henry,	Utica,	*Optional*
Carrier, William Harvey,	Phœnix,	*Agriculture*
Chamberlin, John Calvin,	Cannonsville,	*Science*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Natural History*
Cobb, Fred. Carlton,	Andover.	*Philosophy*
Coffin, John,	Genoa, Neb.,	*Mechanic Arts, Opt.*
Cole, Emma Jane,	Lowell, Mich.,	*Science and Letters*
Collins, Wilbur,	Newburn, Ill.,	*Agriculture, Opt.*
Cook, Charles Button,	Buffalo,	*Architecture*
Cramphin, Harry Alexander,	Morrisville,	*Science and Letters*
Curtis, Frank Smith,	Moravia,	*Science and Letters*
Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Drake, Jeremiah Clinton Merle,	Westfield,	*Natural History, Opt.*
Eastman, Adelbert Lyon,	Arcade,	*Optional*
Eberman, Frank Potts,	Strasburg, Pa.,	*Science and Letters*
Farquhar, Richard Henry,	Little Rock, Ark.,	*Optional*
Ferris, George Ferris,	Philadelphia, Pa.,	*Engineering, Opt.*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchouge,	*Literature, Opt.*
Flanigan, John Richard,	Binghamton,	*Arts*
Forbes, Lewis Eugene,	Mayville, Wis.,	*Science and Letters*
Force, Lafayette,	Tekama, Neb.,	*Science and Letters*
Fox, Walter Howard,	Portland, Me.,	*Agriculture*
Frear, Lewis Baltus,	Ithaca,	*Science and Letters*

Gardner, William,	Syracuse,	*Science and Letters*
Garlock, William Delano,	Little Falls,	*Natural History Opt.*
Gaunt, Thomas Townsend,	Poughkeepsie	*Optional*
Gifford, George Francis,	Jamestown,	*Science and Letters*
Goodwin, DeWitt,	Dresserville,	*Literature*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Hall, Charles,	St. Louis, Mo.,	*Optional*
Halpen, Annie Marie,	Albany,	*Science and Letters*
Halpen, Daniel Patrick,	Albany,	*Arts, Opt.*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Haskell, George Frederick,	Albany,	*Science and Letters*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hawkins, Carlton Richmond,	East Hanburg,	*Optional*
Hayes, Rutherford Platt,	Fremont, O.,	*Science and Letters*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Hill, Henry Benjamin,	Rome,	*Optional*
Hill, Lena Lilian,	Isle La Motte, Vt.,	*Science and Letters*
Hills, Harold Edwards,	Auburn,	*Science and Letters*
Humphrey, Charles,	Ithaca,	*Science and Letters*
Huntley, Willis Arnold,	Troy,	*Literature*
Hutchins, Albro Warner,	Ithaca,	*Agriculture*
Hyde, Charles Howell,	Wolcott,	*Arts, Opt.*
Irvine, Frank,	Sharon, Pa.,	*Science*
Jackson, William Erastus,	Wilmington, Del.,	*Architecture*
Johnston, William Eugene,	Cooperstown,	*Arts*
Jonas, Albert,	Buffalo,	*Optional*
Jones, Frank Henry,	Trumansburg,	*Agriculture, Opt.*
Kelley, Florence Molthrop,	Germantown, Pa.,	*Literature*
Kelley, Irving Washington,	Kelley's Island, O.,	*Mechanic Arts*
Kelley, William Datus,	Kelley's Island, O.,	*Mechanic Arts*
Kendig, John Landon,	Waterloo,	*Optional*
Knapp, James Louis,	Union,	*Science and Letters*
Landon, Eugene Ashbel,	Vineland, N. J.,	*Optional*
Lathrop, Oscar Garland,	Ackworth, N. H.,	*Science*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science & Letters*
Leary, James Thomas,	Ithaca,	*Science and Letters*
Leeds, Charles Starr,	Richmond, Ind.,	*Science and Letters*

Leighton, Herbert Jackson,	Ithaca,	*Mechanic Arts*
Lemen, James Arthur,	Dansville,	*Science*
Leonard, Zenas Lockwood,	Providence, R. I.,	*Optional*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Mack, George William,	Ithaca,	*Mechanic Arts*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
Mason, Milo Leland,	Ithaca,	*Optional*
Martin, Andrew Richey,	Alleghany City, Pa.,	*Arts, Opt.*
McDermid, Henry Angus,	Hillsdale, Mich.,	*Mechanic Arts*
McKinstry, Charles Herbet,	Canajoharie,	*Chemistry, Opt.*
McCrea, Clark Waldo,	Eagle Rock, Pa.,	*Engineering, Opt.*
Mendes, Octaviano Abdon Pereira de,	S. Paulo, Brazil,	*Architecture*
Merry, Addison Delavan,	Phœnix,	*Science and Letters*
Mesick, David Wilson,	Kinderhook,	*Engineering*
Mesick, Frederick Peter,	Kinderhook,	*Engineering*
Messenger, Hiram John,	Cortland,	*Literature*
Mills, Arthur Eugene,	New York City,	*Architecture*
Morris, Robert Tuttle,	New Haven, Ct.,	*Natural History, Opt.*
Munson, George,	New York City,	*Architecture*
Nixon, Charles Elstun,	Cincinnati, O.,	*Optional*
Norton, Henry Mark,	New York City,	*Agriculture*
Norton, James Eddy,	Belmont,	*Literature*
Norton, Su Mary,	Belmont,	*Optional*
O'Brien, Michael John,	Bergen,	*Science and Letters*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston Mass.,	*Mechanic Arts*
Otis, Philip Arthur,	Leeds, Mass.,	*Mechanic Arts*
Outram, Thomas Sidney,	Easton, Md.,	*Agriculture*
Palmer, Nettie Amelia,	Ithaca,	*Natural History*
Parsons, Frank Hall,	Montclair, N. J.,	*Agriculture, Opt.*
Peck, William Dayton,	Cortland,	*Optional*
Pennock, Charles John,	Ithaca,	*Agriculture*
Phelps, Susanna Stuart,	Morrisville,	*Literature*
Pierce, Henry,	Powling,	*Engineering, Opt.*
Pierson, Charles Bertram,	Canandaigua,	*Science and Letters*
Poole, Murray Edward,	Ithaca,	*Arts*

Reeve, Benjamin Harry,	Mattituck,	*Optional*
Roberts, Mary Elizabeth,	Ithaca,	*Philosophy, Opt.*
Rose, Alice Evelyn,	Cleveland, O.,	*Science and Letters*
Rudd, Willis Nathaniel,	Ithaca,	*Natural History*
Ruditch, Pineas,	Odessa, Russia,	*Agriculture*
Rundell, Forest Parlen,	De Kalb Junction,	*Optional*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Sanger, Edward Berry,	Rockville Centre,	*Natural History*
Scott, Frank Jeremiah,	Jordon, Minn,,	*Mechanic Arts*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*
Sheldon, Charles Stiles,	Oswego,	*Natural History*
Slauson, Allan Bedient,	Weedsport,	*Philosophy*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Snyder, Harry Wilson,	Freeport, Ill.,	*Agriculture, Opt.*
Soule, Henry Howard,	Syracuse,	*Literature*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Science and Letters*
Sweet, Carol Lincoln,	Phœnix,	*Science and Letters*
Sweeting, Mary Anna,	South Butler,	*Optional*
Terry, Edmund Burke,	Waterville,	*Science add Letters*
Thomas, Frank Salter,	Bay Ridge,	*Science and Letters*
Tidball, John Satterlee,	Fort Monroe, Va.,	*Science and Letters*
Tiffany, Frank Giles,	Gainesville,	*Science and Letters*
Tilton, John Neal,	Rome, Italy,	*Architecture*
Tilton, Paul Henry,	Rome, Italy,	*Science and Letters*
Tracy, Aurelius Milford,	Ghent,	*Science and Letters*
Trelease, William,	Brooklyn,	*Natural History*
Trump, Edward Needles,	Wilmington, Del.,	*Mechanic Arts*
Turner, Henry Ward,	Vineland, N. J.,	*Natural History, Opt.*
Turner, Samuel Bates,	Ithaca,	*Literature*
Underhill, Isaac Morse,	Norwalk, O.,	*Science and Letters*
Upjohn, Richard Russell,	Brooklyn,	*Engineering*
Vail, Alfred Tennyson,	Chester,	*Science and Letters*
Vance, Lee James,	Penn Yan,	*Science and Letters*
Wagner, Charles Gray,	Whitesboro,	*Natural History*
Waterbury, John Calvin,	Rensselaerville,	*Mechanic Arts*

Webster, Hosea,	Oyster Bay,	*Science*
White, Seward,	West Township,	*Optional*
Whitney, Frank Curtis,	West Danby,	*Arts*
Wilcox, Nellie,	Ithaca,	*Literature, Opt.*
Wilhelm, Henry Walter,	Toledo, O.,	*Engineering, Opt.*
Williams, Henry Kirk,	Dunkirk,	*Chemistry, Opt.*
Wing, Albert John,	Albany,	*Science and Letters*
Wise, Otto Solomon,	New York City,	*Science and Letters*
Woolworth, Amulet May,	Turin,	*Science and Letters*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Ainslie, James Stewert,	Hartwick,	*Arts*
Allen, John Granger,	Aurora,	*Mechanic Arts*
Alling, Robert Bertine,	Bangall,	*Science and Letters*
Ayers, William Judson,	Cairo, Ill.,	*Science and Letters*
Aylen, Henry,	Aylmer, Canada,	*Science and Letters*
Barnes, Justin Llewellyn,	Cambridge, Mass.,	*Agriculture*
Bates, William Horatio,	Washington, D. C.,	*Agriculture*
Battin, Henry Wilson,	Albany,	*Engineering*
Beach, William Brewster,	Brooklyn,	*Agriculture*
Benedict, Thomas, Jr.,	Pittston, Pa.,	*Engineering*
Booth, Quentin Woodbury,	Rochester,	*Mechanic Arts*
Bowman, Seward Lincoln,	New Lisbon, O.,	*Science and Letters*
Boyer, Israel Donald,	Dayton, O.,	*Mechanic Arts*
Brader, William Barton,	White Haven, Pa.,	*Mechanic Arts*
Bredin, George Sloan,	Butler, Pa.,	*Optional*
Brown, William Clinton,	Sandusky, O.,	*Mechanic Arts*
Buckley, Henry Horatio,	Unadilla,	*Science and Letters*
Bullis, Abram Rogers,	Macedon,	*Mathematics*
Burr, Ella,	Newark Valley,	*Literature*
Burr, George Lincoln,	Newark Valley,	*Arts*
Campbell, Edwin,	Mumford,	*Science and Letters*
Candee, Fred Jason,	Moline, Ill.,	*Chem. and Physics*
Carey, Frank,	Fond du Lac, Wis.,	*Science and Letters*
Carll, Richard Clinton,	Northford,	*Optional*
Carman, Frederick Douglass,	Jacksonville,	*Arts, Opt.*

Cartwright, Robert, Henry,	Rochester,	*Mechanic Arts*
Catchpole, Edwin Watson,	Rose,	*Agriculture*
Chapman, Edwin Lyon,	Monroe, Mich.,	*Literature, Opt.*
Cheek, Sue Powell,	Danville, Ky.,	*Optional*
Cheney, Miles Eugene,	Bemus' Point,	*Science and Letters*
Chevaler, Josephine,	New York City,	*Chemistry, Special*
Chittenden, Frank Hurlbut,	Brooklyn,	*Natural History, Opt.*
Clarke, Percy Edwards,	Washington, D. C.,	*Optional*
Cole, Ernest Henry,	St. Louis, Mo.,	*Optional*
Collins, Homer,	Rochester,	*Science, Opt.*
Collmann, John Saunders,	Freeford Falls, Ill.,	*Science and Letters*
Concklin, Henry Sisson,	Poughkeepsie,	*Arts, Opt.*
Copp, Fred Malin,	Jordan,	*Science and Letters*
Cornell, George,	Central Valley,	*Optional*
Cowles, Albert Hutchingson,	Cleveland, O.,	*Optional*
Cummins, Howell Adin,	Conneaut, O.,	*Mechanic Arts*
Cunningham, Andrew,	S. Framingham, Mass.,	*Literature, Opt.*
Curtice, Fred Cooper,	West Winsted, Ct.,	*Natural History*
Davenport, Arthur,	Varna,	*Arts*
Davis, Floyd,	Ithaca,	*Engineering*
Day, Harriet McHarg,	Cooperstown,	*Arts*
Dominick, DeWitt Clinton,	Gallupville,	*Science and Letters*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Ehrlicher, Frederick Matthias,	Watertown,	*Literature, Opt.*
Eidlitz, Otto Marc,	New York City,	*Engineering*
Elliott, George Robert,	Auburn,	*Optional*
Elstun, Volney,	Cincinnati, Ohio,	*Agriculture*
Eustis, George,	New Orleans, La.,	*Science and Letters*
Evans, Mary Richards,	Danville, Ky.,	*Optional*
Ewing, Addison Luther,	La Grange, Wis.,	*Optional*
Flanigan, Walter Jerome,	Binghamton,	*Arts*
Fort, Phebe Irene,	Albany,	*Science and Letters*
Foster, Charles Ebenezer,	Ithaca,	*Agriculture*
Gilbert, Rizpah Margaret,	Le Roy,	*Literature*
Glascock, Jacob Luther,	Philippi, W. Va.,	*Arts, Opt.*
Gregory, George Arthur,	Unadilla,	*Optional*
Greve, Alfred,	St. Louis, Mo.,	*Arts*

Gusdorf, Moses,	Fremont, O.,	*Philosophy*
Halsey, David Rogers,	Bridgehampton,	*Arts*
Hamrick, Jesse Davis,	Belleville, Ind.,	*Agriculture*
Harding, Frank,	Callicoon,	*Science and Letters*
Heron, Nannie Jacobs,	Danville, Ky.,	*Optional*
Herrick, William Porter,	East Randolph,	*Literature*
Heyl, Harriet,	Dunkirk,	*Literature*
Hill, Thaddeus,	Richmond, Ind.,	*Literature*
Hoag, William Isaac,	Aurora,	*Science*
Holcomb, James Warren,	Ravenna, O.,	*Optional*
Holmes, Joseph Austin,	Laurens, S. C.,	*Agriculture*
Holmes, William David,	Pittsburgh, Pa.,	*Optional*
Hornor, Charles West,	New Orleans, La.,	*Science*
House, Edward Mandle,	Houston, Texas,	*Literature, Opt.*
Howell, Frederic James,	Keokuk, Iowa,	*Optional*
Howland, Isabel,	Sherwood,	*Philosophy, Opt.*
Hoyt, William Ballard,	East Aurora,	*Arts, Opt.*
Hungerford, Nye,	Ithaca,	*Agriculture*
Hunter, Nathaniel Perry,	Jasper,	*Arts, Opt.*
Jaynes, DeLos Dan,	North Norwich,	*Science and Letters*
Kelso, John Sinclair,	Stamford, Ct.,	*Engineering*
Kilbourne, Frederic Lucius,	Moravia,	*Agriculture*
Locke, Henry Lincoln,	West Dedham, Mass.,	*Agriculture*
Lounsberry, John Wesley,	Hammondsport,	*Literature, Opt.*
Lnx, Charles Augustus,	Clyde,	*Literature*
Mann, Willis Thompson,	Somerset,	*Agriculture*
Martin, George,	Alleghany City, Pa.,	*Optional*
Marvin, Charles Deming,	Montclair, N. J.,	*Architecture*
McConnell, Benjamin Franklin,	Chicago, Ill.,	*Optional*
McClumpha, George,	Amsterdam,	*Optional*
Millard, Charles Ketchum,	North Adams, Mass.,	*Science & Letters*
Miller, Irvine,	Washington, D. C.,	*Literature*
Morrow, Charles Edwin,	New York City,	*Mechanic Arts*
Moses, Willis Holley,	Malone,	*Science and Letters*
Mott, David Wallace,	Bangor,	*Optional*
Moulton, Guy,	Cicero,	*Science and Letters*
Northrop, May,	Woodhull,	*Science and Letters*

ιeague, Clara Louisa,	Caribou, Me.,	*Science and Letters*
Thomas, Charles Elu,	Waterloo,	*Agriculture*
Thompson, Ervin William,	Smithville, Ga.,	*Mechanic Arts*
Ogden, Charles Edwin,	Penn Yan,	*Optional*
Olmsted, Charles,	Tarrytown,	*Science and Letters*
Ostrander, Will Sterling,	Schuylerville,	*Optional*
Otis, Hanna Wood,	Sherwood,	*Science and Letters*
Palmer, Edgar Anson,	Cortland,	*Mechanic Arts*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Parke, Henry Tyllmann,	Binghamton,	*Arts*
Parmelee, Robert Murray,	Cleveland, O.,	*Science and Letters*
Parmenter, Syrel,	Cohocton,	*Optional*
Pidgeon, John Johnston,	Brooklyn,	*Optional*
Place, Ira Adelbert,	Alfred Centre,	*Science and Letters*
Read, Jesse Edwin,	Greenpoint,	*Engineering*
Rhodes, Kate,	Trempealeau, Wis.,	*Optional*
Rich, Fred William,	West Potsdam,	*Engineering*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Roehrig, Fred Lewis,	Ithaca,	*Philosophy, Opt.*
Rogers, Walter Geer,	Ausable Forks,	*Optional*
Ryman, Frederick Sweasy,	Dallas, Pa.,	*Arts, Opt.*
Salisbury, Herbert Lucius,	Marcellus,	*Mechanic Arts*
Sanchez, Tiberio Sanchez,	U. S. Colombia,	*Agriculture*
Scammon, Richard Montgomery,	Stratham, N. H.,	*Agriculture*
Schnable, Emile Ralph,	Chicago, Ill.,	*Engineering*
Schumm, George,	San Francisco, Cal.,	*Literature*
Seymour, Frederick Hubert,	Lockport,	*Mechanic Arts*
Shinkle, John Newton Dexter,	Rochelle, Ill.,	*Science and Letters*
Shippen, Henry,	Jamaica Plains, Mass.,	*Literature*
Shiras, George,	Pittsburgh, Pa.,	*Optional*
Skinner, James Henry,	Faribault, Minn.,	*Literature, Opt.*
Smith, Edward Sholl,	Canajoharie,	*Science and Letters*
Smith, Theobald,	Albany,	*Mathematics*
Smyth, Elinor Jeanette,	Owego,	*Optional*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Stambaugh, Henry Hamilton,	Youngstown, O.,	*Science and Letters*
Stearns, James Brainard,	Rouse's Point,	*Arts, Opt.*
Storey, William,	Rochester,	*Engineering*
Studley, Duane,	South Byron,	*Science and Letters*
Taylor, Oscar Livingstone,	Freeport, Ill.,	*Science and Letters*

Tompkins, Myron,	Ithaca,	*Science and Letters*
Tyson, Frank Charles,	Chicago, Ill.,	*Engineering*
Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Duzer, William,	Horseheads,	*Arts*
Van Ness, James Robertson,	Osborn's Bridge,	*Optional*
Vaughn, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Walters, William Andrew,	Phoenix,	*Architecture, Opt.*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Weston, Albert Theodore,	Salem,	*Optional*
Wick, Richard Brown,	Pittsburgh, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy,	*Arts, Opt.*

SUMMARY BY YEARS.

Post Graduates	26
In Senior or Fourth Year Studies	74
In Junior or Third Year Studies	100
In Sophomore or Second Year Studies	167
In Freshman or First Year Studies	154
	521

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	7	8	12	18	45
Literature	3	11	13	15	42
Philosophy	2	1	4	3	10
Science	1	1	7	3	12
Science and Letters	20	33	45	33	131
Chemistry and Physics	3	3	3	2	11
Mathematics	0	0	0	2	2
Natural History	3	4	14	2	23
Agriculture	2	3	18	18	41
Architecture	2	9	6	3	20
Civil Engineering	15	15	12	12	54
Mechanic Arts	14	4	13	14	45
Optional	2	8	20	29	59

Total of Undergraduates	495
Post Graduates	26
Total in the University,	521

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell. On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868-69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds. "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum.*

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course,* under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term ; the instruction begins on the Monday following, and continues until Commencement ; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are *received,* whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows :—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work; but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

Ithaca, the seat of the University, is a town of about ten thousand inhabitants, situated at the head of Cayuga Lake, in Tompkins County, New York. It is accessible from the East, South and West by means of the Erie Railway, leaving that road either at Owego, thence to Ithaca by the Ithaca branch of the Delaware and Lackawanna Railway, or at Waverly, from which place the Ithaca and Athens Railroad leads to Ithaca; or passengers can leave at Elmira, and come directly to Ithaca. From the North there are three roads that leave the New York Central (Auburn Branch), one at Geneva, one at Cayuga Bridge, and the third is the Southern Central, which leaves at Auburn, and crosses the Ithaca and Cortland Road at Freeville. Or persons may leave the New York Central at Syracuse, and reach Ithaca by way of Cortland. The Ithaca and Cortland Railroad starts from the immediate vicinity of the University buildings, and connects with the Southern Central Railroad at Freeville, a distance of nine miles, and with the Syracuse and Binghamton Railroad at Cortland, a distance of twenty miles from Ithaca; in the former case reaching the New York Central Railroad at Auburn, and in the latter at Syracuse.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge.* Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY AND MINERALOGY..

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "Theory of Heat," *Schellen's "Spectrum* Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course :—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects :—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this department:—(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

1. SCHOOL OF THE ANCIENT LANGUAGES.

1. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elementary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos*, *Turkish*, the *Tartar Languages*, *Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year,*—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees by a resolution of April 23d, 1875, authorized and instructed the Faculty to make such arrangements that any student may substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students just entering upon the first term of the first year of their course are especially advised to take the Drill instead of offering any substitute for it. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years.

All students that take Drill must continue it through the term. They are required to provide themselves after the first term of the first year with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe, according to the nature of the case.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.)*Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma,

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is taught in a similar manner, the whole being supplemented by thorough study of historical geology. Field work is required all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and mod of occurrence of mineral deposits; the geological positions and lations of building stones, fictile materials, fossil fuels, light-pr ducers, pigments and other natural accumulations applicable the arts, as well as the relations of practical geology to agricu ure, architecture, civil and mining engineering, sanitary scien etc. These topics are included in a course of lectures given in t winter term, and in the laboratory, special facilities are afford for further progress to such persons as may desire it. In this wa engineers, architects, physicians and agriculturists may obtain knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the su jects treated, such as will serve as an introduction to higher ge logical studies, and afford a general idea of the science to tho who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for him self, without access to books until he is prepared to use them in th final stages of his studies. Work is systematically laid out by th teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with th classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological surve of the hydrographic basin of Cayuga Lake, a district whic presents problems of the highest interest in physical geolog Qualified students will assist in this undertaking, receiving fu credit for their work.

Courses of study and practice for post-graduate students pro vide for advanced work in geology or palæontology to any exten that may be desired. The surface geology of this region is re markable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine nd surgery, by Professor Law. In the Spring Term, (1.) A course f twenty lectures upon comparative anatomy, by Professor Wilder. 2.) A course on economic entomology, by Instructor Comstock. 3.) Lectures on the natural history of man, forming a part of a ourse in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians re required to dissect, first, the common animals, then monkeys, nd afterward human subjects, when they can be procured. pecial attention is given to the animals inhabiting Cayuga Lake nd the vicinity of Ithaca. Instruction is given in the methods of ollecting, preserving and arranging anatomical and zoological pecimens.

Books of Reference.—Students are at liberty to select from the ollowing list of works for reading upon the subjects treated of in he lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's Physiology and Hygiene." In comparative anatomy—Owen, Iuxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies -Wyman ("Symmetry and Homology in Limbs"), Wilder ("Inrmembral Homologies.") In zoology—Agassiz ("Essay on lassification," or "Methods of Study in Natural History"), with enney ("Manual of Zoology") or Milne-Edwards ("Elements of oology"). In economic entomology and ornithology—Packard, amuels, the New York State Reports, and Riley's Reports on ntomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily ursued a partial or special course, there will be given a certifiate, stating the time he has spent, the studies pursued, and his egree of excellence therein. It will be signed by the President of he University and the Dean of the Faculty. A student who has ompleted the full course of four years, will be recommended for he degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy a transcendental logic.

Second Term.—Moral philosophy theories or morals and development of moral sentiments. For the present Moral Philo ophy and Political Economy alternate with each other, each su ject being treated only once in two years. The Junior and Seni classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a cours of lectures on the Philosophy of History. And in the third ter of that year a course of lectures is delivered on Law and Jurispru dence, including the three branches, Constitutional, International and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including th explanation and illustration of the structure, growth and pecu liarities of the language, is incorporated into each of the Genera Courses.

The School embraces two departments, one of Anglo-Saxo and English Literature, and the other of Rhetoric and Gener Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, an embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this departmen until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English languag and literature, from Chaucer to Milton, inclusive. *Second Ter* —Lectures on the English language and literature, from Dryd to Cowper, inclusive. *Third Term.*—Lectures on English ar American literature of the nineteenth century. A Syllabus of tl course, prepared by the professor, presents to the student the lea ing points of each lecture, and the order of their treatment, de ignates the best editions of an author's works, or parts of ther that are generally accessible, and guides the student to su sources, philological, historical, biographical, critical, etc., as enab him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, tl A.-S. Version of the Gospel according to St. John, and selectio from the Homilies of Ælfric. *Third Term.*—Selections fro King Alfred's A.-S. Version of the History of Paulus Orosius, ar of Boethius De Consolatione Philosophiæ, and selections fro the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulun

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; tc extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require; and in fact they are so used on all occasions when the University Sermons spoken of above—under the head of religious instruction, are delivered.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

1. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake;* a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to *twelve* inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly *Report of the* Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell; (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is
more especially by the students in determinative mineralog
blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art a present time, as well as a collection of curious things perta to the department, is being made and will comprise arms o ious patterns, shot, shell, and the various kinds of ammuniti use in the army of the United States. It is believed that th dent being familiarized with the different articles and their no clature, will be enabled to comprehend much better the tec statements of military history; and if his services are requir the national government this information will be of advantag

7. TECHNOLOGY.

Besides the models made at the University, the Museu Technology and Civil Engineering comprises:—(1) A coll of working models in brass and iron, illustrative of mech principles applied to machinery, and an extended series of p graphs for the same purpose, from the establishment of Sch of Darmstadt; (2) Another collection of working models in and iron, illustrative of intricate mechanical combinations an pedients, made under the direction of Professor Willis, of bridge, England, and Professor Rigg, of the College of Mech at Chester; (3) Models illustrative of descriptive geometry, bridge and roof construction, made by Schröder; (4) The grams and charts issued with the sanction of the English mittee of Council on Education; (5) Photographs and m from various sources; (6) A collection of engineering instrun

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are ava for the educational purposes of the University, are made up following:—(1) THE GREENE SMITH ORNITHOLOGICAL INET, a mounted and classified collection of 362 birds, princ American, made and presented to the University by Mr. G Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL LECTION, including about twenty-five thousand species; (3) *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of co ative anatomy and physiology; (4) The lithographic chart diagrams edited by Achille Comte of Paris, and those pub under the auspices of the Council of Education at London; constantly increasing collection of native animals in alcoho of preparations illustrating their structure; (6) A collection sects to which additions are constantly made, specially int

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has heen laid by depositing in the University, for the use of the Faculty and undergraduates, the following: (1) A valuable collection of Photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professor Goldwin Smith and George William Curtis, by Carpenter, presented by President White; with portraits of Humboldt, Hon. Hiram Sibley, Peter Cooper, and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President White, a gift of some friends of the President, and the other of Professor Wilson, a gift of the Students of the University, a bust of Vice-President Russell by Miss Abbot, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin Museum series, as well as the series of heliotype reproductions of the Gray collection.

There is also quite a collection of busts of distinguished men of Classic, Gothic, Renaissance and Modern Sculpture, and architectural ornamentation, made under the direction of the South Kensington Museum, and by Brucciana of London, arranged for the use of students in Free-hand Drawing, and for the departments of Architecture and Engineering.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All Optional students, and students for the Courses in Agriculture and the Mechanic Arts will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations including Radicals.

Regents' certificates issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography and English Grammar.

Certificates issued by the Superintendent of Public Instruction of the State of New York, and certificates of having passed satisfactory examinations at any of the normal schools, academies or high schools of the State of New York. whose requirements for graduation meet the approval of the Faculty, in Arithmetic, Grammar, Geography, Physiology and Plane Geometry, will be accepted in the case of students who have graduated in such schools, instead of an entrance examination in the studies above named.

2. For admission to the courses in Architecture, Civil Engineering and Mathematics, besides what is mentioned above, an examination will be required in Solid Geometry, and Plane Trigonometry (those books preferred in which the trigonometric functions are treated as ratios), including the theory and use of Logarithms.

3. Of all candidates for admission to the courses in Science, Science and Letters, Literature, Philosophy, Mathematics, Natural History, and Chemistry and Physics, examinations will be required, besides those named in the first paragraph above, either in (1) the principles of French Grammar, the translation of English into French and the first book of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar, the translation

of English into German (Whitney's or Comfort's Grammar preferred), and seventy-five pages of Whitney's Reader, or its equivalent; or (except for the course in Mathematics), (3) Algebra entire (*any of the larger ones*), Solid Geometry, and Trigonometry, Plane and Spherical.

4. For the Course in Natural History, candidates will be examined also in Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze and form scientific technical terms.

5. For the Course in Literature and that in Philosophy, besides the general entrance examinations and the French or German, they will be examined in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Catiline, eight orations of Cicero, or five Orations and the *de Senectute*, Virgil's Eclogues, and six books of the Æneid.

6. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, Latin the same as for the Course in Literature, with the addition of an examination in Greek; Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

7. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

NATURE OF THE EXAMINATIONS.

Some idea of the character of the Entrance Examinations may be derived from the specimens of examination papers given below. They are in all cases papers that have actually been given to classes when examined for admission, and are but fair samples of what will be given hereafter. And although perfect answers to all the questions are not indispensable, yet a near approach to perfection is required in all cases.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission, after having passed at least one term's examinations. They will, on such a testimonial, be admitted to the University without further examinations. The testimonial must certify to both good character and good scholarship. Such a testimonial will merely admit the bearer to the University; it will not admit him to any particular advanced standing. On this admission he will be allowed to join any class in any study that requires no previous preparation except the general preparation for admission to the University, as for example, French with the Freshman class, German with the Sophomore.

But if the student desires to join any class in Latin, Greek, advanced French or German, or Mathematics, he must apply to the professor in charge of the department, and undergo such examination as he may require in order to satisfy himself of the student's ability to go on with the class.

Students coming from other colleges or universities, are ***in no case*** admitted at ***once*** to any advanced standing as Sophomore, Junior or Senior. The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he comes from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

Entrance Examinations will be held only in June, January and September, as indicated on pp. 7 and 8 of this Register. The examinations in January and June will begin at 9 o'clock a.m.; those in September at 10 a.m.

On the first day examinations will be held in Arithmetic, Algebra, and Plane Geometry.

On the second day, Physiology at 8 a. m., geography at 10 a. m., and English Grammar and Orthography 2.30 p. m.

On the third day beginning at 9 a. m., French, German, Greek, and Solid Geometry; at 2.30 p.m., Latin, and Plane Trigonometry.

No examinations for the admission of students will be held after those at the beginning of the second term until those in June, just before Commencement, which will begin on Monday, 9 a. m.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the beginning of the next term, except in cases where very urgent reasons have prevented the student being present at the regular entrance examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, not having entered any other college or university, will be required to pass the entrance examinations. They will then be in the same relation to the classes as those that have come from other colleges.

TIME REQUIRED FOR GRADUATION.

No student will be permitted to graduate who has not pursued the studies of his course for four entire years in this University; except those who, having pursued part of the studies of their course before coming here, propose to enter at an advanced standing. But in order to do so they must pass up, before the close of their first year, in all the studies that have been pursued by the class they intend to enter. And students who, by sickness or absence on leave, have lost a part of their time will be allowed in

some cases to take more than the regular studies of their course by asking permission of the Faculty at the beginning of each term. Otherwise no extra studies will be taken into account in considering the qualifications for graduation.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations, or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on those who have graduated in the Course in Philosophy on the same conditions as upon those who have graduated in the Course in Science.

The degree of CIVIL ENGINEERING is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of additional study and practice, shall have passed the requisite examinations in the School of Engineering.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of this University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications for examination and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

CERTIFICATE OF JOURNALISM.

Although no special course has been arranged in journalism, arrangements have been made for giving special instructions to those who intend to make journalism their profession. These arrangements consist, so far as the University is concerned, in

The art of printing. Students will be required to do work at type-setting in its various branches, the reading and correction of proofs, the making up and working off of forms, in the University printing-office, under the direction of the Director of the University Press, to such an extent that they will be able to take charge of an office and do book and job work by themselves.

Besides this, students will be required to study phonography, under an approved teacher, and to acquire some knowledge of telegraphy; and as neither of those subjects is taught in the University they must be acquired by the students outside of the University, and at their own expense.

To all students in either of the General Courses who shall have complied with the foregoing conditions there will be given, in addition to the Diploma appropriate to their course, a *Certificate of Journalism*, signed by the University authorities and the University seal affixed, as follows:

1. To all students in the Course in Literature, or in that in Philosophy, who shall have satisfactorily completed the course.

2. Of students in the Course in Arts it will be further required that they shall have taken at least one term in French and two in German in their course.

3. Of students who have completed the Course in Science it will be required that they shall have taken all the studies that are in that course in the departments of History, of Languages and of Philosophy and Letters, and shall have prepared themselves, *outside of the University course*, to pass, before the beginning of their fourth or Senior year, a satisfactory examination in Latin Grammar and some Latin Reader, sufficient to enable them to read and translate ordinary Latin Sentences.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.

2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.

3. To agricultural students who are (1) pursuing either the three or the four years course and *intending to complete* the course; or, (2) to other students, *for two years only*, who take not less than ten hours of recitations per week in two or more of the following departments: (*a*) Agricultural Chemistry; (*b*) Veterinary Science (*c*) Practical Agriculture and Farm Work; (*d*) Botany, Horticulture, and Entomology as applied to Agriculture,

For all others the tuition fee is twenty-five dollars a term.

No matriculation or entrance fees are required; nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - -	$ 75.00
Room, board, lights and fuel, about - - - -	240.00
Total, - - - - - -	$315.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, etc., can be had in it at an expense of from five five to seven dollars per week.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and lights will be about $7.00 per week, to be paid in advance. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The Courses of Study, both General and Technical, are made up of the instruction already described under the title of "Scope of the Instruction" as given in the various departments and schools of the University, combined in different proportions and groupings, as will be seen below.

In the following statement of the several courses the figures in parentheses denote the number of exercises per week. The word "or" in italics between two or more studies denotes that they are equivalent for each other and that either of them may be taken at the option of the student.

In computing Laboratory Practice two hours and a half of actual work is regarded as equal to one recitation. And no student is received in any Laboratory for less than seven and a half hours of actual or the equivalent of three recitations per week, except in regular courses where a shorter time is specified.

In Drafting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. THE COURSE IN ARTS.

Leading to the degree of Bachelor of Arts.

[*Italics denote elective studies.*]

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1), *physiology, French, German, mathematics, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism* (6).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (11).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term—Logic (3); essays and criticism (1): *Greek, Latin, modern languages, English literature, Mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors: *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

II. THE COURSE IN LITERATURE.

Leading to the degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (4); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); Latin, modern languages, *or* science (6); special literature (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman Empire (4); Latin, modern languages *or* science (6); special literature (2); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history(4); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course with an entrance examination in German will take elementary French and advanced German in the second year. And those who have French for their entrance examination will take elementary German and advanced French during that year.

III. COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, to begin on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); analytical geometry (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); calculus *or* astronomy (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—German *or* French (3); botany (3); electricity and magnetism (2); chemical lectures (3); laboratory practice (3); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (4); chemistry (2); geology (3); heat (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman Empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course will, after passing an entrance xamination in French, take elementary German the first year and dvanced French the second, and those who enter with a prepaation in German will take elementary French the first year and dvanced German the second.

IV. COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE.

I. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six ectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French (5) and German 3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *r* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); analytal geometry (5); experimental mechanics (3); rhetorical exerses (1).

Second Term.—French *or* German (3); zoology (3); calculus astronomy (5); electricity and magnetism (2); chemistry (3); etorical exercises (1).

Third Term.—French *or* German (3); botany (3); electricity d magnetism (2); chemical lectures (3); laboratory practice) ; rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (2); chemistry (2); geology (3); English terature (1); essays (1); *optional,* six hours, of which at least hree must be given to one of the following sciences: *botany, hemistry* or *zoology.*

Second Term.—Acoustics and optics (3); geology (3); English iterature (1); essays (1); *optional,* seven hours, of which at east four must be given to one of the following sciences: *botany, hemistry* (including *mineralogy*) or *zoology.*

Third Term.—Acoustics and optics (3); descriptive geometry 4); English literature (1); essays (1); *optional,* seven hours, f which at least four must be given to one of the following scinces: *botany, chemistry, geology* or *zoology.*

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The names of the sciences in the above lists of optional studies are used in the widest sense, and as including several quite distinct courses of lectures and laboratory practice, any of which may be taken either alone or in combination with others.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the whole year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

Students who have had an entrance examination in German will take elementary French five times a week and advanced German three times a week during the first year and advanced French three times a week during the second year, both in this course and in the course in science and letters; and those who have their entrance examination in French will take elementary German and advanced French the first year and advanced German the second year.

Students who enter with algebra, geometry and trigonometry will take elementary French and German with physiology, zoology and botany the first year, and advanced French and German the second year.

2. COURSE IN SCIENCE AND LETTERS

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); physics (3); ancient history (1); rhetoric (1); analytical geometry (5) *or* modern languages (2); *optional* (3).

Second Term.—French *or* German (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); calculus (5) *or* zoology (3); and modern languages (2).

Third Term.—French *or* German (3); botany (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); modern languages (2).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); geology (3); essays (1); English literature (1); *optional* (4).

Second Term.—Moral philosophy (2); history Roman Empire (4); essays (1); English literature (1); *optional* (7).

Third Term.—Logic (3); mediæval history (4); essays (1); English literature (1); *optional* (6).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

3. COURSE IN CHEMISTRY AND PHYSICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French and German (8), rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (2); geology (3); chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); physical practice (4); chemical practice (10); organic chemistry (1).

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (5); organic chemistry (1).

4. COURSE IN MATHEMATICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Algebra (2); spherical trigonometry (3); French and German (8); rhetoric and composition (2); linear drafting (2).

Third Term.—Harmonoid geometry (3); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (2); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); shades, shadows and perspective (3); history (3); geology (3); history of philosophy (2); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); astronomy (5); history (4); English literature (1).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6).

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

5. COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—Modern languages (8); rhetoric (2); free-hand drawing (5); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Modern languages (3); rhetoric (1); lectures on human physiology (3); physiological laboratory work (5); experimental mechanics (3).

Second Term.—Modern languages (3); rhetoric (1); lectures on general zoology (3); laboratory work in zoology (6); electricity and magnetism (2).

Third Term.—Modern languages (3); rhetoric (1); general lectures on botany (3); field work in botany (2); lectures on special zoology (2); laboratory work in embryology (2); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); blow-pipe determination of minerals (3); heat (2); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); special field and laboratory work in botany (3); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (2); acoustics and optics (3).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (2).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (8).

Third Term.—Advanced work in botany, geology or zoology or veterinary medicine and surgery (13).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology. In case they take a partial course of less than four years, these students are advised to arrange their studies in consultation with the several professors of Natural History.

ADDITIONAL REQUIREMENTS.

In addition to the studies named in the foregoing courses students are required, in order to take the degree to which it leads, to attend lectures on general agriculture, and the lectures on modern history by President White.

V. THE COURSES IN AGRICULTURE

THE FULL COURSE OF FOUR YEARS.

Leading to the degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Chemistry, general (3); geometry (5); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).

Third Term.—Botany (lectures (3), field work (2) (5)); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams (3), compositæ and field work (2) (5)); geology (3); heat (2); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology, lectures (3), vegetable histology and laboratory work (2) (5); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR

First Term.—Agriculture, lectures (5); practice (3, Tuesday and Thursday afternoons); botany (fungi (3), principles of horticulture (2)) (5); geology, practice, (3).

Second Term.—Agriculture, lectures (5); practice (2, Tuesday and Thursday afternoons); botany (systematic and applied, lectures (3), laboratory work on gramineæ or special groups (2) (5)); horticulture (2).

Third Term.—Agriculture, lectures (4); practice (3, Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (1).

A COURSE OF THREE YEARS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); chemistry, agricultural (5); chemical practice (3); drawing, free-hand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); geometry (5).

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

THIRD OR JUNIOR YEAR.

Same as the fourth year of the four years course.

VI. COURSE IN ARCHITECTURE.

Leading to the degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing; six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Algebra (2); trigonometry (3); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting.

Third Term.—Descriptive geometry (4); draughting (2); French *or* German (5); rhetoric (2); shading.

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry (4); French (3) *or* German (5); experimental mechanics (3); analytical geometry (5).
Second Term.—Calculus (5); French (3) *or* German (5); chemistry (3); electricity and magnetism (2); draughting.
Third Term.—Building materials and construction (3); French (3) *or* German (5); botany (3); electricity and magnetism (2); chemistry (3); free-hand drawing (3).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows, and perspective (3); mechanics (3); heat (2); lectures on Egyptian, Greek, and Roman architecture (2); designing (3); draughting (2).
Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (3); optics and acoustics (3); mechanics (2); designing (3); draughting (2).
Third Term.—Optics and acoustics (3); lectures on Gothic architecture (3); free-hand drawing (3); designing (4); draughting (2).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (1); geology (3); designing (8).
Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).
Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

VII. THE COURSE IN CIVIL ENGINEERING.

Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Tuesday in October.
Second Term.—Algebra (2); spherical trigonometry (3); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).
Third Term.—Descriptive geometry (3); draughting (2); French *or* German (5); rhetoric and composition (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); descriptive geometry (4);

French *or* German (3); experimental mechanics (3); draughting of original problems (2).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2); tinting and shading (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering and sketching (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); architecture (2); shades, shadows and perspective (3); heat (2); topographical mapping and sketching (2).

Second Term.—Higher geodesy (5); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); geology (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); metallurgy (2); advanced structural geology (3); stone cutting, original problems and draughting (5); plane table (1).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to present, at the beginning of the first term of their second, third and fourth years, a memoir upon subjects selected by them before the close of the spring term. The memoirs of the first two years will refer to descriptions and drawings of some important engineering work, manufacturing process or other suitable subject; but during the remainder of the course the students are required to embody in their memoirs or reports original investigations.

VIII. THE COURSE IN MECHANIC ARTS.

Leading to the degree of Bachelor of Mechanical Engineering,

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); free-hand drawing and shop practice (5).

Second Term.—Solid geometry (5); French *or* German (5); *free-hand drawing* and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3).

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5): shades, shadows and perspective (3); heat (2); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

OPTIONAL COURSES.

Optional Courses are those which the student may select for himself; and in no course is it necessary, for the attainment of a degree, that the studies should be followed exactly in the prescribed order: and in the General Courses equivalents will be accepted, in some cases, for the studies indicated, provided they are of the same general character.

Any student, however, who intends to graduate at all should by all means select the course that leads to the degree he expects to take, and follow it in the order above laid down; the disadvantages of doing otherwise are so great as to render success almost impossible.

Undergraduates are also permitted, upon proper application to the Faculty, at the beginning of any term, to transfer themselves from one of the General Courses to an Optional Course, or, with the consent of the Faculty concerned, to any Special Course. All the courses have been arranged upon a basis of three lectures or class exercises a day, thus occupying fifteen hours a week; but students who find themselves able to accomplish more than this are allowed to take additional studies. And so, too, students who are obliged to labor as a means of self-support are sometimes, upon sufficient reasons shown to the Faculty, excused from attendance upon the full standard number of University exercises. This, however, does not obviate the necessity of completing the entire course before graduating.

POST-GRADUATE COURSES.

No regular post-graduate courses have been marked out by the various Departments of the University. It is found that in most cases, students who desire to spend a portion of time at the University after taking their Baccalaureate Degree, have each of them some one special study to pursue, or object to accomplish, which differs in so many respects from those of any other student, that it is hardly possible to classify them or to arrange beforehand, in any general way, a course that will meet their wants. Accordingly, the practice thus far has been for the student himself to indicate, on his entering the University, his wishes; and in case the studies he wishes to pursue are not already provided for in the schedule for the term, his application is referred to the appropriate Faculty or to some one professor who is in charge of the department in which his studies are chiefly comprehended, when a course is arranged for him and provision made for his prosecuting it.

JOURNALISM.

Although no special course in Journalism has been marked out, students wishing to prepare themselves for Journalism or the profession of Law, who nevertheless cannot take a full course of four years, may, with the same qualifications for admission as are now required for the Course in Science, and some elementary knowledge of Latin, arrange for themselves an optional course, that can be completed in two years, which will include (1) one year of French, (2) one year of German, or two years of either or both the above languages, (3) all the studies and exercises in rhetoric, composition, oratory and general literature, (4) most of the studies in moral and intellectual philosophy, including psychology, logic, moral philosophy and the history of philosophy, (5) all the studies in the departments of history and political science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{2}{3}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{10}{31}$, and $\frac{1}{3}$.

Simplify $$\frac{1}{1+\dfrac{2}{3\frac{4}{5}}}.$$

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.1\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for \$1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, \$250; Dec. 5, 1876, \$400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argentine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*, *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.
16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?
17. State some of the uses of *it*.
18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.
19. What is the objective or factitive predicate?
20. Write out correctly the following sentences:
(*a*) One fine afternoon everybody was on deck amusing themselves as they can.
(*b*) Whom but he was true to me.
(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.
(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.
(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.
(*f*) Man could now travel further in an hour than he had previously in a day.
(*g*) Six month's interest are due.
(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.
(*i*) Nothing need to be said so firmly and nothing oftener than this.
(*k*) How will we know which is the greatest of the two?
21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.
22. Write a sentence containing an adjective clause, drawing a line under the clause.
23. Write an interrogative sentence, and parse it.
24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.
2. To draw a common tangent to two given circles; and demonstrate.
3. Two triangles are similar, if their homologous sides be proportional.
4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.
5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to fin the surfaces [or the perimeters] of the regular inscribed and ci cumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

[*At least five of the following questions will be asked.*]

1. Make an outline diagram of the body, excluding head an limbs, and locate within it the following organs: Stomach, hear liver, lungs, spleen, kidneys, intestine, diaphragm.
2. Name the chemical elements of the body, stating which a gases.
3. What first happens to milk in the stomach?
4. Enumerate the digestive fluids, stating which is acid.
5. State all the uses of the stomach.
6. What is the object of digestion?
7. Give a diagram of the right side of the heart.
8. Of the left side.
9. What is the heart composed of?
10. What are the differences between the air inspired, and t air expired.
11. Give some familiar examples of acids.
12. Give some familiar examples of alkalies.
13. Describe the movements of a frog's heart while beatin (The frog is supposed to have been etherized, or killed by cutti the spinal cord just behind the head.)
14. Which way does blood flow in the arteries of the arn Which way in the veins of the arm? How do you know?
15. Explain the pulse.
16. What changes in the form of the body occur during insp ation? What during expiration?
17. State the average number of your respirations per min when sitting still; while standing; while lying down. State t same for the pulse.
18. What is the pupil of the eye?
19. What change of the pupil occurs when one comes fron dark into a lighter room?
20. Do the ribs usually move in respiration while lying down
21. How many teeth has a child four or five years old, and wh are they called?
22. How many teeth has a youth of fifteen?
23. How many has a grown person? Name the different kin of teeth.
24. Name the uses of the tongue.
25. Name the uses of the lips and cheeks.
26. What happens in the throat when you swallow?
27. What is the difference between walking and running?

28. What is the peculiar property of the muscular tissue (the ed flesh or lean meat)?

29. Make an outline diagram of a frog's brain. (Kill the frog, or toad, with chloroform, and remove the top of the head between the eyes with a penknife.

30. Enumerate the principal parts of the central nervous system. (They are the spinal cord, medulla oblongata, cerebellum, optic lobes, thalami, hemispheres, and olfactory lobes.)

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

implify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4x^4+1+3x^2$ by $-2x+3+2x^2$, finding the iotient to 3 terms, the remainder, and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a sitive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{3}{0}$? Of $\frac{0}{3}$, d why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is w half full, n gallons of water flow per minute, and 10 gallons w out. How soon will the cistern be empty? Interpret your ult when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always visible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your sult.

(*c*). Find how far you must ride at the rate of a miles an hour, d walk back at the rate of b miles an hour, to be gone c hours.

6 (*a*). Reduce the following radicals to their simplest form, d add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify $\dfrac{3^{-\frac{1}{3}}\,a^{\frac{4}{9}}}{3^{\frac{2}{3}}\,a^{-\frac{5}{9}}}\,(2b)^\circ$; also, $(5^{\frac{2}{3}})^{\frac{3}{4}}$.

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{-\frac{n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{-\frac{n}{2}}\right)$.

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(*b*). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(c). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}$.

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.
:s mögen nun etwa acht Tage her sein, da ritt ich in die freie hsstadt ein, welche dort jenseit des Forstes gelegen ist. Bald ıf gab es darin ein schönes Turnieren und Ringelrennen, und :honte meinen Gaul und meine Lanze nicht. Als ich nun einın den Schranken still halte, um von der lustigen Arbeit zu n, und den Helm an einen meiner Knappen zurück reiche, nir ein wunderschönes Frauenbild in die Augen, das im alrrlichsten Schmuck auf einem der Altane stand und zusah. fragte meinen Nachbar, und erfuhr, die reizende Jungfrau ɜ Bertalda, und sei die Pflegetochter eines der mächtigen Herdie in dieser Gegend wohnen. Ich merkte dass sie auch ansah, und—wie es nun bei uns jungen Rittern zu kommen t—hatte ich erst brav geritten, so ging es nun noch ganz anlos. Den Abend beim Tanze war ich Bertalda's Gefährte, las blieb so alle die Tage des Festes hindurch."

Parse the following nouns, writing the genitive singular and native plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* *4rbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

Parse fully the following verbs, giving the principal parts, rule ıe mood, tense, and position of each: *mögen* (1), *ritt* (1), *en ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisze* (10).

II.

Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dasz* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc, quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum, sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione*, *voluntatis*, *concursare*, *for-*

tuna. Explain the subjunctives *sit, cupiat, velint*. Decline *nemo, vestrum, operis, quaestus*. To what classes of verbs do *perhorrescat, audet*, and *concursare* belong? Give the principal parts of *cupiat, audet, coeptum est*. Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat*. Compare *bene, felix, facilis, primus, vetus*. State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris?* Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας*.

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs, are *εἶδεν, δεδέσθαι, περιρρυῆναι?*

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of *ἔχοντες, ἀνέκαυσαν, ἦλθον.* Explain the phrase *ἀθύμως ἔχοντες*: the *case* of *σίτου.*

4. *Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.*

Give the acc. sing. in all genders of *πλείους*: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. *Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε ἀποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.*

Give synopsis of the tense and voice to which *ἀφείς* belongs. Point out the enclitics in this passage. Explain the mood of *τολμᾷ.*

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of *θείη* and *ποσσί.* In what tense, mood, voice, and from what verbs, are *ἔγρετο* and *ἀμφέχυτο*? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τὼς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of *προσεφώνεε, μέσσῳ, ὄληαι.* In what tense, mood, voice, and from what verbs, are *ἀπεχθήρω* and *ὄληαι*?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.

2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.

3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).

4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere, are 85°, 100°, and 130°. Find the area of the spherical triangle in square inches.

PLANE TRIGONOMETRY.

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Prove that $1+\tan^2 A=\sec^2 A$; also, that $\cos A \div \sin A = \cot A$.

(*c*). Obtain the value of $\sin A$ in terms of $\tan A$.

2. Find the six logarithmic functions of 243° 25′ 5″. What functions of this angle are negative?

3. Obtain the formula for the cosine of the sum of two angles; and deduce the formula $\cos 2x = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$.

4. Prove that in any plane triangle the sum of either two sides is to their difference as the tangent of half the sum of the opposite angles is to the tangent of half their difference.

5. Given two sides of a triangle equal to 99.3425 and 31.2345, and the included angle equal to 169° 58′ 12″, find the remaining angles.

TERM EXAMINATIONS—GENERAL COURSES.

I. HISTORY AND POLITICAL SCIENCE.

I. ANCIENT HISTORY—PROFESSOR RUSSEL.

1. Into what races are mankind divided ethnologically?
2. Into what families are the languages of Europe and Asia divided philologically?
3. To what race of mankind do the Chinese belong and to what family does their language belong?
4. About how far back do Chinese records extend?
5. What attention have the Chinese paid to the history of their nation?
6. When did Confucius live? What was the character of his teaching?
7. What nations successively conquered China, and at about what time? Of what nationality is the present ruling race?
8. To what race do the people of Hindoostan belong, and to what family does their language?
9. What attention did the East Indians pay to history? Describe their intellectual character and habits.
10. What have been the prevailing religions of the East Indians? State their doctrines.
11. By what nations has Hindoostan been successively conquered?
12. Of what race were the Babylonians?
13. How far back can we trace Babylonian history?
14. Of what nationality were the Assyrians?
15. What memorials of Babylonian and Assyrian history remain?
16. Describe Assyrian civilization.
17. By what nation were Babylon and Assyria conquered?
18. What was the extent of the Persian monarchy under Darius Hystaspis?
19. How far back does our knowledge of Egypt extend? To what races did the Egyptians belong?
20. What means have we of knowing Egyptian history and civilization? Describe their civilization.
21. By whom were Persia and Egypt finally conquered, and of whose empire did they become a part?
22. To what races did the Hellenes belong? Which were the two principal sub-races?
23. What was the general character of the Spartan government? What was the character of the Athenian government? Explain as to each.

2. ROMAN HISTORY—PROFESSOR RUSSEL.

I.

1. Who were the original Italians?

2. What other people belonged to the same family?

3. After the Italians came into Italy, into what nations were they divided?

II.

1. At what date does the authentic history of Rome begin?

2. What authority have we for facts said to have occurred before that period?

III.

1. What was a Roman gens? a curia? a century? a tribe?

2. Under what two great divisions were the free inhabitants of Rome classed?

3. What rights had they respectively?

4. What means of obtaining privileges did the unprivileged class several times use?

IV.

1. What principle in regard to the possession of land is conspicuous in Roman history?

2. How did the small proprietors of land lose it?

3. What was the effect on the prosperity of Rome, of the want of small landed proprietors?

4. What was the object of the agrarian law?

5. Who were the Gracchi, and what did they accomplish?

V.

1. What was the prevailing policy of Rome with respect to foreign nations?

2. By what wars did Rome extend her power?

VI.

1. What was the effect of foreign conquest on the prosperity of the Romans?

2. How did it affect their mode of life, their independence, their morality?

VII.

1. In the time of Marius who were Roman citizens?

VIII.

1. What were the original causes of the loss of Roman liberty?

2. Who first destroyed Roman liberty?

3. After him what form of government did Rome need?

4. Between what persons was the struggle for supreme power?

3. HISTORY OF THE ROMAN EMPIRE—PROFESSOR RUSSEL.

1. What were the powers of the Emperor Augustus and of his immediate successors? Whence were those powers derived?

2. After the time of the Antonines, what body virtually appointed the Emperor? What was the origin of that body, and how large was it?

3. What change did Constantine the Great make in the imperial residence and in the constitution of the empire?

4. By whom and when was the empire divided into two parts—the Eastern and the Western? Give the limits of the two parts. What was the effect of that division on the decline of the empire?

5. How and when did the Roman Empire of the West become extinct?

6. To what principal causes was the decline of the Roman empire due?

7. How were the Goths divided? Where did they come from? Where were they when they first appeared in Roman history? What Roman emperor was defeated by them and when? When and under whom did they finally conquer Italy? How long did they keep possession of it?

8. Who were the Franks and where did they live?

9. Who were the Alemanni? Where did they live?

10. Who were the Huns? Describe the effect of their emigrations on the empire?

11. Where did the Vandals come from? Who was their most distinguished leader? Where did they finally settle?

12. Where did the Lombards come from? When and under whom did they conquer Italy? State particularly how Italy was divided between them and the Exarchs.

13. Who was Pepin le Bref? In what way and when did he become king of France? What return did he make for the decision in his favor? What present power rests on this transaction?

14. Who was Mohammed? Give date of the Hegira. Give his character, his doctrines and his purpose.

15. What was the origin of the Ottoman empire? What was its extent in Asia? On what occasion did the Ottomans enter Europe?

4. MEDIÆVAL HISTORY—PROFESSOR RUSSEL.

I.

1. Describe the Celtic character and religion.
2. What was the result of the Roman conquest of Gaul?

II.

1. Whence did the invaders come who conquered the Gallo-Romans? Name the different nations and say where they settled.

III.

1. How many dynasties of French kings have there been?
2. Name them and the period of the duration of each.

IV.

1. How did the first dynasty come to an end?
2. Where was Neustria? Where was Austrasia?

V.

1. Who was the first Carlovingian king?
2. How and when did he become king? Describe the transaction, showing the advantages on both sides.

3. Describe the character of Charlemagne. What became of his kingdom and when?

VI.

1. Describe the territory and the authority of the earlier kings of the third dynasty.
2. By whom were they opposed? Describe the power of these opponents.
3. Which king of France first extended his authority over the whole country?

VII.

1. To what did the bishop of Rome owe his supremacy over the other bishops?
2. What was the foundation of the temporal power of the Popes?
3. What claim did the Popes make in relation to the government of foreign nations? State the foundation of this claim and on what ground it was resisted.
4. Describe the decisive struggle between the Popes and the temporal sovereigns and the result.

VIII.

1. Describe the feudal system.
2. Mention the various services which were due from the vassal to his lord.
3. Describe the mode of life of a feudal baron.
4. What were the good effects of the system?
5. How did the system operate on the lower classes?
6. How did feudalism come to an end?

IX.

1. What attempts were made under the Valois kings to secure popular liberty?
2. Why did they fail?
3. What was the tendency of the monarchy under those kings? Describe the progress of royal power.

5. MODERN HISTORY—PRESIDENT WHITE.

1. Give some account of Brunelleschi and his connection with the history of Florentine Art.
2. Sketch the cause of the decline of Art after Michael Angelo and Raphael.
3. Give a brief account of the Colloquies of Erasmus. Name some of them. State the resemblances between Erasmus and Voltaire.
4. Give the main features of the struggle between the Obscurantists and Humanists, with an account of the part taken by Pfefferkorn.
5. Give the dates of Charles V's accession to the thrones of Spain and Germany. What was his title as king of Spain?
6. Give a short account of the attempt, made by Charles V on

one side and Francis I on the other, to secure the alliance of Henry VIII.

7. What was the league of Schmalkalden? What was the Peace of Passau, and when?

8. State the effect of the war between Charles V and Joseph I on Protestantism in Germany.

9. Give the names of Loyola's principal associates in founding the Order of the Jesuits.

10. State the part taken by Sainez at the Council of Trent.

11. Give the date of the beginning of the Council of Trent. Where is Trent?

12. Describe the connection of Wallenstein with the Thirty Years War.

13. What is Cardinal Richelieu's relation to the history of religious toleration?

14. What struggle was going on in England at the time of the Fronde?

15. Name the two religious orders founded by St. Vincent de Paul.

16. Name the chief political opponents in Europe of Louis XIV. What were "Les Chambres de la Réunion"?

17. Give the main points in the connection of John Law with the French Government.

6. FRENCH HISTORY—PRESIDENT WHITE.

1. What is Mignet's remark regarding the transition from the classic literature of the time of Louis XIV to the philosophic literature of the time of Louis XV?

2. Give a general statement regarding Voltaire's life and influence.

3. Give some idea of the method of attacking old institutions in France taken by Montesquieu in the Persian Letters.

4. Give Rousseau's idea of representation in a republic as stated in the treatise on the Social Contract.

5. Name some of the principal Encyclopædists. Why were they so called? What relation do they bear in the history of French thought to Voltaire and Rousseau?

6. What was Jansenism?

7. Who was Maurepas? What were his ideas regarding the formation of the Ministry?

8. State the main agencies through which the American Revolution influenced the French.

9. Up to what period of the French Revolution was this influence exercised and why did it cease?

10. What was the great preliminary question regarding the States General to be decided before the meeting?

11. What as soon as it had met?

12. State Burke's objection to the way the States General was composed and give your own opinion.

7. ENGLISH HISTORY—PROFESSOR GOLDWIN SMITH.

1. Of what races is the British nation composed? In what districts does each race prevail?
2. What were the powers of the Saxon kings? Was the monarchy hereditary or elective?
3. What political struggle took place in the reign of Edward the Confessor?
4. Give the leading features of the policy of William the Conqueror in Church and State.
5. For what principle did Anselm contend against Henry I? What was the issue of the contest?
6. Of what tendency of the feudal system is the reign of Stephen an example?
7. What was the question at issue between Henry II and Thomas à Becket? What was the immediate, and what the ultimate result of the struggle?
8. State the good and bad features of the character of Richard I, connecting them with the state of morality and civilization in his time.
9. What was the most important article of the Great Charter?
10. What new religious orders appeared in England in the time of Henry III? What led to their foundation?
11. Give an account of the statute of Mortmain.
12. What economical crisis marked the reign of Edward III? To what legislation did it lead?
13. What led to the insurrection of Wat Tyler?
14. What were the political consequences of the Wars of the Roses?
15. Why is the reign of Henry VII said to mark the commencement of Modern History?
16. How far was the Reformation carried in the reign of Henry VIII?
17. What was the policy of the Protector Somerset?
18. Account for the religious reaction at the accession of Mary.
19. What led to the development of the English drama in the age of Elizabeth?

7. POLITICAL ECONOMY—PROFESSOR WILSON.

[*Specimens of sets of questions, twenty in all, drawn by lot by each student.*]

NO. 4.

4. What is utility or intrinsic value? What objects have such value? Has the same article different intrinsic values? How is this?

24. Who are *traders?* What is their relation to each of the two factors of wealth, quantity and value?

44. What has been the law or ratio of increase as between population and distributive wealth *up to this time?* Is there any reason to suppose that that ratio will ever be different?

64. What is simple barter? Show the advantages of a circulating medium as a labor-saving machine.

84. Explain the use of money as a *machine* for exchange. Why are gold and silver preferable to other metals?

NO. 12.

12. What is *price* and how does it differ from value? Show the error of Mill's doctrine [B. I. Chap. I. § 3.] that price results only from limitation of supply. Explain $P=V+(d-s)$.

32. In what sense is land a "force of nature," to what extent a "machine"? Regarded as a machine, what are the "forces" that it utilizes?

52. Show that the rate of wages will increase with the intelligence of the laborers. Does this apply to the educated few only or to the masses as well?

72. State and explain the principal ways in which the cost of transportation and exchange can be diminished.

92. State the difference, in case of loss by the sinking of a ship and such like calamities, between the loss of a sum in coin and that of the same sum in bills (1) to the parties themselves and (2) to the community.

8. PHILOSOPHY OF HISTORY—PROFESSOR WILSON.

[*Specimens of the sets of questions furnished to each student by lot.*]

NO. 2.

2. What are the three agents that control the causes and results of history? What are the different theories of their relative influence?

22. Why may we not expect any high civilization in extreme latitudes? What is the effect of elevation above sea level on civilization?

42. What influence has intellectual culture on religion with reference to (1) fetichism, (2) polytheism and (3) monotheism?

62. Describe the circumstances of race and physical position that made Athens the place of origin of modern civilization.

NO. 8.

8. Compare the value of the geological and the philological indications as to man's early conditions.

28. What size, in a city, is regarded as most favorable to civilization? What are the *physical* effects of increase beyond this limit?

48. How were the Chinese written characters formed? How do they differ from the polysyllabic words of Indo-European languages?

8. What circumstances, historically, gave the Christian religion advantage over the heathen religions of the time?

9. AMERICAN LAW AND POLITY—PROFESSOR WILSON.

[*Forty lectures in all.—Sub-divisions of the Course.*]

I. The Constitution of the United States. Lects. I—XII.
II. International Law. Lects. XIII—XVII.
III. Municipal Law. Lects. XVIII—XX.
IV. Laws Relating to Property. Lects. XXI—XXXII.
V. Criminal Law. Lects. XXXIII—XXXVI.
VI. Legal Maxims. Lects. XXXVII—XL.

[*Specimens of subjects, forty in all, drawn by lot one for each tudent.*]

II.—The Continental Congress and Articles of Confederation.
IX.—Restraints upon Congressional Legislation. Art. I. Sec. 9.
XIV.—The relation of Nations in times of Peace.
XVII.—Rights and Liabilities in time of War.
XVIII.—Origin and Development of National Codes.
XXI.—Nature and Kinds of Property. Eminent Domain.
XXV.—Real Estates by Contracts among the living.
XXVII.—Contracts for Personal Property.
XXXI.—Agency and Partnership.
XXXIII.—What constitutes a Crime. Crimes against Governments.
XXXVIII.—Maxims relating to the Judiciary.
XL.—Maxims fundamental to all Law.

II. ANCIENT LANGUAGES.

I. LATIN—PROFESSOR PECK.

I. HORACE—ODES, I, 2, 30–52.

1. Translate:—

Tandem venias precamur
Nube candentes humeros amictus,
Augur Apollo;
Sive tu mavis, Erycina ridens,
Quam Jocus circum volat et Cupido;
Sive neglectum genus et nepotes
Respicis, auctor,
Heu nimis longo satiate ludo,
Quem juvat clamor galeaeque leves
Acer et Mauri peditis cruentum
Vultus in hostem;

Sive mutata juvenem figura
Ales in terris imitaris, almae
Filius Maiae, patiens vocari
    Caesaris ultor:
Serus in caelum redeas diuque
Laetus intersis populo Quirini;
Neve te nostris vitiis iniquum
    Ocior aura
Tollat: hic magnos potius triumphos,
Hic ames dici pater atque princeps,
Neu sinas Medos equitare inultos,
    Te duce, Caesar.

2. Who are meant by *Erycina ridens, auctor, filius Maiae*, and why are they introduced here? State the occasion and the thought of the Ode.

3. Construe *populo, vitiis, dici*. Compare *acer, juvenem, diu, ocior*. Give the derivation of *mutata, ales, almae, pater*. Form diminutives to *vultus, populo, filius*, and to the comparative of *magnos*.

4. Draw a map of Italy, and locate upon it *Anio, Antium, Roma, Tarentum, Tibur, Venusia*.

5. Translate, and make full metrical schemes of the lines

(1) Dignum laude virum Musa vetat mori.
(2) Ille mi par esse deo videtur.
(3) Doctrina sed vim promovet insitam.
(4) Neque hic lupis mos nec fuit leonibus.

II. DIALOGUS DE ORATORIBUS, IX.

1. Translate:—

Nam carmina et versus, quibus totam vitam Maternus insumere optat (inde enim omnis fluxit oratio), neque dignitatem ullam auctoribus suis conciliant neque utilitates alunt; voluptatem autem brevem, laudem inanem et infructuosam consequuntur. licet haec ipsa et quae deinceps dicturus sum aures tuae, Materne, respuant, cui bono est, si apud te Agamemnon aut Iason diserte loquitur? quis ideo domum defensus et tibi obligatus redit? quis Saleium nostrum, egregium poetam vel, si hoc honorificentius est, praeclarissimum vatem, deducit aut salutat aut prosequitur? nempe si amicus eius, si propinquus, si denique ipse in aliquod negotium inciderit, ad hunc Secundum recurret aut ad te, Materne, non quia poeta es, neque ut pro eo versus facias; hi enim Basso domi nascuntur, pulchri quidem et iucundi, quorum tamen hic exitus est, ut cum toto anno, per omnes dies, magna noctium parte unum librum excudit et elucubravit, rogare ultro et ambire cogatur, ut sint qui dignentur audire, et ne id quidem gratis; nam et domum mutuatur et auditorium exstruit et subsellia conducit et libellos dispergit. et ut beatissimus recitationem eius eventus prosequatur, omnis illa laus intra unum aut alterum diem, velut in herba vel flore

:cepta, ad nullam certam et solidam pervenit frugem, nec aut citiam inde refert aut clientelam aut mansurum in animo cuius-m beneficium, sed clamorem vagum et voces inanes et gaudium icre.

. Origin, exact meaning, and syntax of *cui bono*. Customs al-ed to in *deducit, salutat, prosequitur*. Etymology and precise ce of *ultro*. Construction of *id, gratis*.

;. History, circumstances and influence of the *recitationes*.

l. Outline of the Dialogus. Prominent peculiarities of its style, l discussion of question as to its authorship.

5. Characteristics and explanation of the prevailing literary style the age.

III. PLINY—EP. II, I.

1. Translate:—

Post aliquot annos insigne atque etiam memorabile populi Ro-ani oculis spectaculum exhibuit publicum funus Vergini Rufi, aximi et clarissimi civis, perinde felicis. Triginta annis gloriae iae supervixit. Legit scripta de se carmina, legit historias et pos-ritati suae interfuit. Perfunctus est tertio consulatu, ut summum stigium privati hominis impleret, cum principis noluisset. Cae-ires quibus suspectus atque etiam invisus virtutibus fuerat evasit, :liquit incolumem optimum atque amicissimum, tamquam ad hunc ›sum honorem publici funeris reservatus. Annum tertium et oc-›gesimum excessit in altissima tranquillitate, pari veneratione. Isus est firma valetudine, nisi quod solebant ei manus tremere, itra dolorem tamen. Aditus tantum mortis durior longiorque, ɜd hic ipse laudabilis. Nam cum vocem praepararet acturus ı consulatu principi gratias, liber quem forte acceperat grandio-ɜm et seni et stanti ipso pondere elapsus est. Hunc dum sequi-ır colligitque, per leve et lubricum pavimentum fallente vestigio ecidit coxamque fregit, quae parum apte collocata reluctante aetate ıale coiit. Huius viri exequiae magnum ornamentum principi, ıagnum saeculo, magnum etiam foro et rostris attulerunt. Lau-atus est a consule Cornelio Tacito: nam hic supremus felicitati ius cumulus accessit, laudator eloquentissimus.

2. Derivation of *dum*, and its successive meanings and construc-ions. Changed meaning of *privatus* under the empire. To ›hom do *Caesares* and *optimum* refer?

3. History of the word *Caesar* as a title. Prominent features f a *funus publicum*, and of a *laudatio funebris*. Misuse some-mes made of the latter.

4. Careers of Verginius Rufus and of Cornelius Tacitus, and ıeir relations to Pliny.

5. Character of the Latinity and the literature of the Silver Age. icero's and Pliny's letters in regard to their style and historical alue.

IV. LUCRETIUS—II, 1157–1174.

1. Translate :—

Praeterea nitidas fruges vinetaque laeta
sponte sua primum mortalibus ipsa creavit,
ipsa dedit dulcis fetus et pabula laeta;
quae nunc vix nostro grandescunt aucta labore,
conterimusque boves et viris agricolarum,
conficimus ferrum vix arvis suppeditati:
usque adeo parcunt fetus augentque labore.
iamque caput quassans grandis suspirat arator
crebrius, incassum manuum cecidisse labores,
et cum tempora temporibus praesentia confert
praeteritis, laudat fortunas saepe parentis
et crepat, anticum genus ut pietate repletum
perfacile angustis tolerarit finibus aevom,
cum minor esset agri multo modus ante viritim.
tristis item vetulae vitis sator atque vietae
temporis incusat momen caelumque fatigat
nec tenet omnia paulatim tabescere et ire
ad capulum spatio aetatis defessa vetusto.

2. Derivation and analogues in cognate languages of *fruges, fetus, pabula, caput, manus, genus, pietas, modus, caelum, capulus.* Unusual forms and constructions. Connection of this passage with the philosophy of Lucretius.

3. Biography of Lucretius; his personal character as gathered from his poem; his relations to his predecessors and to his successors; peculiarities of his versification; characteristics of his Latinity; an outline of his cosmical, theological, and ethical notions.

2. GREEK—PROFESSOR FLAGG.

I. PERSIANS OF AESCHYLUS.

I. *vv.* 1–139. Designate the principal divisions of this passage, and state by whom and in what manner each was probably performed. Give the technical name of the part comprising *vv.* 93–100. What difference in tone is observable between what immediately precedes and what follows this part?—Comment on οἶτε (16): στεῦται (49): ἄκμονες (51): περσέπτολις (65): ἔσσεται (syntax) 121.—Explain the metrical peculiarity of *v.* 32 (*cf.* 152). —*Translate vv.* 12–20 and 101–113.

II. *Translate vv.* 447–464. Explain the mood and tense of ἐκσωζοίατο (451) and τράποιντο (459). Scan *vv.* 447–448.—*Translate vv.* 739–752, and scan *v.* 741.

III. *vv.* 800–828. Explain the negative particles in *v.* 802. How does Darius say that he arrives at a knowledge of what he narrates in the following lines?—Explain the mood and tense of ἐκχέῃ (826).—Give the date of the historical event referred to in *this passage.* Show the significance of Δωρίδος (817.)

Mention any instances of tragedies with historical subject earlier an the *Persians*. By what means is the present play rendered ınhellenic (not exclusively Athenian) in spirit? How has Aesıylus contrived to give it the usual religious character? In what d the ὕβρις of Xerxes consist?

II. AGAMEMNON OF AESCHYLUS.

I. *Translate* (*a*) *vv.* 97–103: (*b*) 145–155: (*c*) 164–178: (*d*) ;2–257.—Designate the main divisions of the Parodos, give a synɔsis of the contents of each and show their bearing on one an:her. What state of mind on the part of the Chorus is exhibited ɾ the Parodos as a whole?—Explain the mythological allusions in ıssage (*c*). Describe the ethical doctrine on which the dynasty : Zeus, as conceived by Aeschylus, is founded. What are the ınctions of the Aeschylean Μοῖρα?

II. *Translate* (*a*) 379 (ἔστω)–386: (*b*) 456–465 (ἀμαυρόν): (*c*) ɔo–708: (*d*) 750–762: (*e*) 987–994.—Point out the transitions of ıought in the first Stasimon, and show how they accord with the elings of the Chorus. How is the second Stasimon connected ith the first, and each Stasimon with the Epeisodion preceding ? Wherein does the third Stasimon exhibit a different mode of :flection from the other two?—State fully the divergence from ɩe popular belief announced in passage (*d*), with (*a*) and (*b*), etc. [ow far is the notion of a family curse reconcilable with Aeschyɩs' system of ethics? Give the Greek words which may be rearded as technical terms in the expression of the doctrine.

III. *Translate* (*a*) 925–934; (*b*) 1177–1190: (*c*) 1523–1536.—·ive the leading traits in the character of Agamemnon as drawn y Aeschylus.—What artistic purposes are served by the scene etween Cassandra and the Chorus? Remark on its relation to ɩe unity of the tragedy.—Give the substance of Clytaemnestra's efense, and that of the Chorus' reply. Explain *vv.* 1535–6. /hat are the subjects of the second and third plays of the trilogy? tate the grounds of the final reconciliation.

IV. From what verbs and where formed are ἐπίανεν (276): ὑπερ-ιας (786): πραθέντα (1041): ἔφευξας (1308): ἔλακες (1426): ἀλύξειν :615)?

III. PLATO'S LACHES.

I. 181 A, B. What does ὅτι (before ὀρθοῖς) connect?—ὅτι before ιεῖα?—Where is ἀφίεσο formed?—Explain the case of ὅν (σὺ νῦν ·αινεῖ): the meaning of καὶ (σὺ δέ).—*Translate from* Εὖ γε *as far* ɾ σοι εἶναι—Characterize Lysimachus from this passage and 180 ', E, etc.

II. *Translate* 192 E, 193 A.—Where is ἐκτήσεται formed?—Exain αὕτη (193).—Where is the proposition antithetic to (εἰδότα) *αἰν*?—What is the fault in Laches' second definition of courage? What was the fault in his former one?

III. 196 C, D. Explain the construction of *οἴεται*: the force of *αὐτὴν* (*ταύτην τὴν ἐπιστήμην*). *Translate as far as οὕτως ἔλεγες.*—Wherein is the definition of Nicias proved to be faulty? To what important Socratic doctrine does the refutation of it lead?

How may the assumed time of this dialogue be approximately determined? Show the appropriateness of the selection of Nicias and Laches as interlocutors, with reference to their personal traits. How is Socrates represented in comparison with the two generals (see especially 188 C, etc.)?

IV. DEMOSTHENES (I. II. III. IV. VIII).

I. Ol. *I*, § 28.—*Translate the section.*—What faults in Athenian disposition and policy are summed up in this tripartite division of *ἅπαντας*?—Explain *εὐθύνας* as here used.—What may be said of the perorations of the Demosthenic speeches in general?

II. Ol. *III*, §§ 8–9.—Expand *τῆς περιστάσης ἂν ἡμᾶς αἰσχύνης* into a clause.—Explain the construction of *ποιῆσειν* (§ 9).—What were the relations of the Athenians with the Thebans and the Phocians at this time?—*Translate* § 9.

Why may the events of the Olynthian war be said to form a period in the public career of Demosthenes?

III. *Chers.* §§ 5 and 6.—*Translate and analyze this period.*—Give a brief account (with date) of the negotiation of the Peace here spoken of.—Specify some points of which the treatment in this oration (§§ 13, 18, 35, 49, 51, 59, 61, 66, 76, 77,) is noticeably different from that adopted in the early speeches, and explain the difference of tone.

V. (A.) PINDAR.

Translate (*a*) Oylmp. I, 17 (*ἀλλά*)–29: (*b*) Nem. II, 13–18: (*c*) Isthm. I, 28–40.—Note, in (*a*), the transition to the mythical part and the words that have been previously introduced to prepare for the subject of it. What is there in the handling of this mythus that is characteristic of Pindar?—Show, in (*c*), the significance of coupling the two heroes named in the mythus, giving the obvious (17), and the (as is conjectured) remoter reason.

(B.) THEOCRITUS.

Translate (*a*) I, 39–44: (*b*) XI, 38–43: (*c*) XV, 132–138.—Explain (etymologically, by comparison with the Attic) the following dialectic forms:—*ᾡδήκαντι* (I, 43): *τράφω, νεβρώς* (XI, 40): *ἔχοισα* (XV, 131): *οἰσεῦμες* (133).—What are the merits that chiefly distinguish Theocritus among the writers of the Alexandrine period?

ARABIC—PROFESSOR RŒHRIG.

I.

1. Translate:—

هُوَ كَانَ رَجُلًا عَالِمًا
كُنْتُ حَاضِرًا

2. Explain the construction.
3. Change it to modern Arabic.

II.

1. Translate:—

غَزَالٌ مَرَّةً عَطِشَ فَجَاءَ إِلَى عَيْنِ مَاءٍ
يَشْرَبُ وَكَانَ ٱلْمَاءُ فِي جُبٍّ عَمِيقٍ ثُمَّ
إِنَّهُ لَمَّا رَامَ عَلَى ٱلطُّلُوعِ لَمْ يَقْدِرْ

2. Could فَأَتَى be substituted for فَجَاءَ ? Give other synonyms of جَاءَ What is the literal meaning of عَيْنِ مَاءٍ ؟

III.

1. Translate the following lines from the Koran:—

إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ
إِهْدِنَا ٱلصِّرَاطَ ٱلْمُسْتَقِيمَ صِرَاطَ ٱلَّذِينَ
أَنْعَمْتَ عَلَيْهِمْ غَيْرِ ٱلْمَغْضُوبِ عَلَيْهِمْ وَلَا ٱلضَّالِّينَ

2. In what particular sense is ٱلصِّرَاطُ ٱلْمُسْتَقِيمُ to be understood in this connection?

IV.

The following is from Voltaire's Charles XII. The passage begins on page 208 in the Lippincott edition, with the words:—"*Charles XII menacé n'était pas maître de sa colère*, etc. Point out the correspondence between the Arabic translation and the French text.

فلمّا سمع كرلوس منه هذا التّهديد لم
يتمالك نفسه من شدّة الغيظ الذي قام به
وقال له أطع سيدك فيما أمرك إن أمكنك
ذلك واخرج من عندي فاغتاظ الباشا وخرج
من عنده مسرعًا يركض فرسه على خلاف عادة الترك

SANSKRIT—PROFESSOR RŒHRIG.

I.

1. Translate the following text, which presents two dissimilar readings. Point out and explain the passages which differ from each other:—

अस्ति गौतमस्य मुनेस्तपोवने महातपा नाम मुनिः ।
अस्ति गौतमस्य महर्षेस्तपोवने महातपा नाम मुनिः ।

तेनाश्रमसन्निधाने मूषिकशावकः काकमुखाद्भ्रष्टो दृष्टः ।
तेनाश्रमसन्निधाने मूषिकशावकः श्येनमुखाद्भ्रष्टो दृष्टः ।

ततो दयायुक्तेन तेन मुनिना नीवारकणैः संवर्द्धितः ।
पश्चाद्दयालुना मुनिना नीवारकणैः स पालितः ।

तदनन्तरं मूषिकं खादितुम् अनुधावन् विडालो मुनिना दृष्टः ।
तं च मूषिकं खादितुं यत्नादभिनिष्यं विडालो मुनिना दृष्टः ।

तं मूषिकं भीतम् आलोक्य
तपःप्रभावात् तेन मुनिना
मूषिको बलिष्ठो बिडालः कृतः।
ततस्तेन तपःप्रभावात् मूषिको
बिडालः कृतः।

II.

1. Translate (Mahabharata, Calcutta, 1834, Vol. I, p. 482, from line 31):—

दमयन्ती तु रूपेण तेजसा यशसा श्रिया।
सौभाग्येषु च लोकेषु यशः प्राप सुमध्यमा।
अथ तां वयसि प्राप्ते दासीनां समलङ्कृतं।
शतं शतं सखीनाञ्च पर्युपासच्छचीमिव।

2. Do not the words यशसा ---------- यशः प्राप seem to imply some inconsistency or contradiction, a confounding as it were of *means* and *end*? the acquiring of something that was already possessed and even the obtaining of the latter by *itself* as a *means*?—And does not the *end* obtained (यशः) appear inferior or less than the *means* from which it resulted? (रूपेण + तेजसा + यशसा + श्रिया &c.)?—And again, does not in those two verses, the unharmonious repetition

of the *same* word (यशः) as well as that of प्राप and in the last line प्राप्ते , tend to enfeeble the style and make it by its monotony unimpressive and unpleasant?

3. Does not this also, in a measure, apply to the ending षु in सौभाग्येषु which is immediately followed by लोकेषु ? And would not both sound and sense gain by the substitution of सौभाग्येन for सौभाग्येषु of the Calcutta Edition?

4. In what sense is लोकेषु to be understood?—Where does the substantive लोक come from? Exhibit its root in its principal ramifications as they appear in Greek, Latin, German, and English.

5. Of what is प्राप composed?—What is the literal meaning of सुमध्यमा ?

6. What does दास, fem. दासी originally denote? From what does it come? How do you explain it in दम्पतिः? Compare with the latter the Greek δεσπότης.

7. What is the construction of वयसि प्राप्ते ? Illustrate it by other examples.

III.

1. Give analogous Sanskrit forms and words equivalent both in sound and sense, to the following Greek and Latin terms; explaining, moreover, every similarity in the principle of formation: viz. ἔδραμον, ἐδίδων, ἔδων, ἐτίθην, ἔθην, λέλοιπα, πέποιθα, ἕρπομεν, τέρπετε, πατέρα, δοτῆρα, *datus*, *junctus*, *sterno*, *creo*, *cupio*, *esto*, *sunto*.

2. Compare the Sanskrit स्वसृ with the German *Schwester* and the English *sister*. Show also its relation to the Latin *soror*.

3. What Sanskrit case-endings correspond in form to the Latin terminations of *nobis*, *vobis*, and to the Greek of ναῦφιν and ναυσί?

III. MODERN LANGUAGES.

I. FRENCH—PROFESSORS KOEHRIG AND STEBBINS.

Translate the following into French:

1. The bookseller has good books, and the carpenter has bad ones. Here are two. Which do you desire?
2. I am not satisfied with those which I have read; can you not lend me a better one?
3. There are ten trees in my garden, and fourteen in my brother's, how many have you in yours?
4. I have only two, and I gave them to him, and I cannot sell you any.
5. Wine is good for the sick; milk is better for you and me, and water is excellent when one is thirsty.
6. Has the girl any more silk? I need some in order to mend my silk stockings.
7. She bought some this week, but used some in order to mend my hat, and now she has no more.
8. Who asked for my mother to-day? The painter, whom you know, asked if she was at home: I do not know what his name is.
9. It is not suitable for us to go out when it rains, nor to remain at home when it is fine weather.
10. In order to learn French you must study and write many exercises.
11. At what hour did your brother go to bed this evening? We could not speak to him, for he went away too early.
12. Are you General Smith's oldest daughter? No, sir, I am not.
13. Has anything happened to them? We did not see them at church this morning.
14. Why do you not make haste? It is a quarter before nine, and you are to take your little brother to school.
15. I have eaten nothing the whole day, but I am neither hungry nor thirsty.
16. Colonel G. has money and he buys beautiful paper and French engravings. It does not become him to reproach me with my conduct.
17. Those apple trees are mine, these are my wife's. Whose are the flowers which you are carrying from market?
18. They belong to my shoemaker. He has just bought them this afternoon and now is going to put them in his child's garden.
19. If you have heard of your son, it is important that you write to him and tell him not to marry that girl; he ought not to go near her.
20. I doubt that he goes to England. I do not believe that he has any friends there, and I do not think that one can be without friends in a foreign country.
21. As soon as he had said this, he rose and spoke to them, and

said, "Do not injure him, bring him to me, and remember what he did to you when you had few friends and needed brave ones."

22. Whatever I may do, I cannot help laughing when that boy comes near me; the sleeves of his coat are six inches too short, and he wears a white cloth hat and he carries a cotton umbrella.

23. Take care not to lose your purse. I am afraid you have left it in your room, and you must pay your tailor to-morrow seventeen dollars for your half-dozen shirts.

II. SECOND YEAR—SECOND TERM.—PROFESSOR CRANE.

I. CORNEILLE'S CID.

1. *Translate:*

Les Maures vont descendre; et le flux et la nuit
Dans une heure à nos murs les amènent sans bruit.
La cour est en désordre, et le peuple en alarmes;
On n'entend que des cris, on ne voit que des larmes.
Dans ce malheur public mon bonheur a permis
Que j'ai trouvé chez moi cinq cents de mes amis,
Qui, sachant mon affront, poussés d'un même zèle
Se venaient tous offrir à venger ma querelle.
Tu les as prévenus; mais leurs vaillantes mains
Se tremperont bien mieux au sang des Africains.
Va marcher à leur tête, où l' honneur te demande:
C'est toi que veut pour chef leur généreuse bande.
De ces vieux ennemis va soutenir l'abord,
Là, si tu veux mourir, trouve une belle mort;
Prends-en l' occasion, puisqu' elle t' est offerte;
Fais devoir à ton roi son salut à ta perte:
Mais reviens-en plutôt les palmes sur le front.

2. Give principal parts of all irregular verbs in the above passage.

3. Parse *Tu les as prévenus*, (line 9), and give rule for agreement of past participle in compound tenses.

4. Parse *c'est toi que*, (line 12). Parse *Fais devoir à ton roi son salut*, (line 16), and illustrate this construction by an original example. Give etymology of *bonheur*, (line 5).

5. Divide the first three lines into feet, and indicate the cæsura. What are the various names applied to this metre, and why?

6. State what you know about the sources of this play.

II. LA MAISON DE PENARVAN, PAR JULES SANDEAU.

a. 1. *Translate:*

PAUL (*se levant aussi*). Ah! ma cousine, si vous le prenez ainsi, nous ne pourrons jamais nous entendre. Il y a entre nous une révolution, un monde écroulé, un abîme . . . et nous ne parlons pas la même langue.

RENEE. C'est tant pis pour vous, monsieur de Penarvan!

PAUL. Et que m'importent les destinées de la maison de Penarvan? Est-ce que je la connais? Qu' a-t-elle fait pour moi? Votre père, anticipant sur la mort, avait jugé plaisant de rayer le mien du nombre des vivants; vous, ma cousine, vous ne saviez pas même que je fusse de ce monde, et il a fallu qu'un hasard se chargeât de vous l'apprendre . . . . Vous êtes accourue; pourquoi? pour rapprocher les débris de notre famille? pour m'apporter l'oubli du passé? Allons donc! Vous n'êtes venue que pour préserver cet illustre nom de la souillure d'une mésalliance . . . une mésalliance pour vous, mais non pour moi, qui me fais gloire d'être de mon temps et ne suis d'ailleurs ni duc ni marquis.

2. Parse *pis* (line 5), *que* (line 6), *est-ce que* and *qu'* (line 7), *qui me fais* (line 15).

3. Explain mood of *fusse* (line 10), and *chargeât* (line 11).

b. 1. Explain the accent in: *à, là, dû, tû, mâle, château, état, finît.*

2. Write the first person singular, present indicative of *se promener, posséder, appeler, jeter,* and the feminine of *premier* and *complet.*

3. Translate line 1021 of the Cid: *Justes cieux! me trompé-je encore à l'apparence. Ou si je vois enfin mon unique espérance?* Explain *trompé-je.*

c. Translate into French the following sentences:

1. When I shall have caused myself to be killed, perhaps she will regret me.
2. I have seen them (masc.) strike.
3. I have seen them (fem.) struck.
4. I have heard her sing a French song.

III. SECOND YEAR—THIRD TERM.—PROFESSOR CRANE.

I.

1. *To be translated at sight:*

MONTAIGNE.

On sait avec quelle constance il avait étudié les grands génies de l'ancienne Rome, combien il avait vécu dans leur commerce et dans leur intimité. Doit-on s'etonner que son ouvrage porte, pour ainsi dire, leur marque, et paraisse, du moins pour le style, écrit sous leur dictée? Souvent il change, modifie, corrige leurs idées. Son esprit, impatient du joug, avait besoin de penser par lui-même; mais il conserve les richesses de leur langage et les formes de leur diction. L'heureux instinct qui le guidait lui faisait sentir que, pour donner à ses écrits le caractère de durée qui manquait à sa langue, trop imparfaite *pour être* déjà fixée, il fallait y transporter, y naturaliser en quelque sorte les beautés d'une autre langue, *qui*, par sa perfection, fût assurée d'être immortelle ; ou plutôt, l'habitude d'étudier les chefs-d'œuvre de la langue latine le conduisait à les imiter. Il en prenait à son insu toutes les formes, et se faisait Romain sans le vouloir. Quelquefois, réglant sa marche irrégulière, il semble imiter Cicéron même. Sa phrase se développe lentement, et se remplit de mots chosis qui se fortifient et se soutiennent l'un l'autre dans un enchaînement harmonieux.— *Villemain*, 1790-1867.

2. Give principal parts of ***sait, vécu, doit, paraisse, écrit, sentir, fallait, conduisait, remplit.***
3. Parse ***paraisse, fût assurée.***
4. Parse ***quelle, lui faisait sentir que.***
5. Derivation of ***durée, insu.***

II.

1. ***To be translated at sight:***

A QUOI DOIVENT TENDRE LES EFFORTS DU SAGE.

C'est l'erreur que je fuis : c'est la vertu que j'aime.
Je songe à me connaître, et me cherche en moi-même.
Sur cette vaste mer qu'ici-bas nous courons,
Je songe à me pourvoir d'*esquif et d'avirons,
A régler mes désirs, à prévenir l'orage,
Et sauver, s'il se peut, ma raison du naufrage.
C'est au repos d'esprit que nous aspirons tous ;
Mais ce repos heureux se doit chercher en nous.
Un fou rempli d'erreurs, que le trouble accompagne,
Est malade à la ville ainsi qu'à la campagne.
De nos propres malheurs auteurs infortunés,
Nous sommes loin de nous à toute heure entraînés.
A quoi bon ravir l'or au sein du nouveau monde?
Le bonheur tant cherché sur la terre et sur l'onde
Est ici, comme aux lieux où mûrit le coco,
Et se trouve à Paris de même qu'à Cuzco:
On ne le tire point des veines du Potose.
Qui vit content de rien possède toute chose:
Mais, sans cesse ignorants de nos propres besoins.
Nous demandons au ciel ce qu'il nous faut le moins.

—*Boileau*, 1636–1711.

2. What is the metre of this poem?
3. Explain the use of the article with ***erreur, vertu*** (line 1), ***or*** (line 13), *bonheur* (line 14).
4. Derivation of ***prévenir*** (line 5), ***naufrage*** (line 6), ***mûrit*** (line 15).

*** Skiff and oars.**

2. GERMAN.

I. FIRST YEAR—THIRD TERM.—PROFESSORS HEWITT AND MACKOON.

I.

1. How has *zu* in German, *to* in English, come to be used with the infinitive form of the verb?

2. What relations in a sentence may this form of the infinitive sustain?

3. When is the infinitive without *zu* used?

4. What is the office of the participle in the tenses called compound, and throughout the passive voice?

5. How does the subjunctive differ from the indicative in meaning and in form? Three of its main uses.

6. How have prepositions been chiefly derived?

7. How were expressed, in the earlier forms of German and English, the relations which are now indicated by prepositions?

8. How are conjunctions classified? Mention all the general connectives.

9. What means are employed in the derivation of verbs, nouns and adjectives? What is the primitive form of these parts of speech?

10. Expand the three letters *t, k, p*, into the nine Indo-European mutes; state the law of their progression, and show by a table how according to this law they would be represented in German and English. Show by a separate table the actual correspondence between English and German.

Translate into English, (Whitney's "Reader," p. 158) from "So findet die Erwartung sich jeden Tag genährt," to "Sondern in einem Saale unter Bekannten zu sein."

II.

1. What is the syntactical relation of *Tag* (1), *Strasse* (12), *Galerie* (13)?

2. Point out in the first two periods five different classes of pronouns.

3. Why is *auf* separated from *packen* (7), and why does it adhere to *hört* (12)?

4. Where is *sei erlaubt* (3) made? why subjunctive? Why is *sei* not transposed? Explain *werden behängt* (8, 9) and *behängt sind* (14).

5. Why do *tritt* and *glaubt* (19) stand at the end and beginning of their respective clauses?

6. What kind of subordinate clauses are introduced by *bis* (2), *die* (11), *dass* (17)? Show their relation to the words on which they depend.

7. Why does *selten* (17) not immediately precede its verb, *erinnert*, as well as *nun* (11) its verb, *aufhört?* Why is *sondern* (19) used, rather than *aber?*

8. Explain the use and meaning of the suffixes: *ung* in *Erwartung* (1); *lich* in *endlich* (2), *icht* in *thöricht* (3), *haft* in *ernsthafte* (4), *er* in *Römer* (4), *gekläppert* (7), *wohnbarer* (18), *fältig* in *sorgfältig* (5), *ig-keit* in *Bedächtigkeit* (6), *bar* in *wohnbarer* (18).

9. Give the derivation of *legt* (4), *hütet* (5), *nach* (9), *erinnert* (17), *immer* (18), *nicht* (19).

10. What are the English cognates of *Glocke* (2), *Zeichen* (3), *erlaubt* (3), *Augenblick* (4), *gleicht* (12), *Zimmer* (16), *Dach* (17), *tritt* (19), *glaubt* (19), *sondern* (19).

III.

Translate into German:

When two French grenadiers, who had been prisoners in Russia heard that France had lost, and that the emperor was a prisoner, they wept together over this sad news. Then said [the] one *of them*, who was wounded: "My old wound burns again and pains me sorely; I shall not live much longer." "Thou canst die," replied the other, "for thou hast neither wife nor child at home, who would have to go begging, but for thee." "Wife or child concerns me not," said the first again, "when my emperor is taken. If thou comest to France, grant me this last request: have me buried in French earth, with my musket in my hand, and the cross of honor on my breast, that I may lie there and listen till the emperor shall ride over my grave; then I will come forth armed, to protect him."

IV.

[*The Honor Section may perform the following in addition to the foregoing*].

Translate into English, (Whitney's "Reader," p. 26) from "Der Ritter fuhr in seiner Erzählung fort," to "meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Derivation of *Ritter* (1), *Erzählung* (1), *Erhitzung* (3), *sein* (8.)

2. Etymology of *Pferde* (2). *Angst* (3), *grund* in *Abgrund* (5), *kreuzend* (11), *erst* (13).

3. English cognates of the root in *Erzählung* (1), *scheuen* (2), *triefte* (3), *Angst* (3), *werfe* (5).

4. Parse *wäre angerannt* (1, 2, 3), *werfe* (5), and give the reason for the subjunctives.

5. Define the terms "inversion" and "transposition," and give the rules for the employment of each.

II. SCHILLER'S WILHELM TELL.—PROFESSOR FISKE.

[*Examination for two Terms.*]

I.

1. *Translate*, (Act I, sc. 2) from "Er ist dir neidisch, weil du glücklich wohnst," to "Der kluge Mann baut vor."

2. Give *a.* the plurals of *Mann; b.* the various meanings of *rb ; c.* the difference in the construction of the clauses introduced *weil* (line 1) and *denn* (line 3); *d.* the reason for the form *keins* ıd the etymology of the word; *e.* the etymology of *Kaiser* and e importance of it in philology; *f.* the various meanings of the em *Reich* (or *reich*) and the cognates in English; *g.* the cogıtes of *trägst; h.* the omission in line 5 and the rule for it; *i.* ıe plurals of *Land* and their various significations; *j.* the inflecon of *Herrn; k.* the various changes of the stem in *höchsten;* the reason for *-heit* in *Christenheit; m.* the composition of *jünger; n.* the derivation and grammatical character, as here used, f *sein* (fourth word in line 9); *o.* the etymology of *Glück,* of *gifter,* of *Missgunst; p.* the abstract noun derived from the stem of *ngst* and the rule for such derivation; *q.* the English cognates f *geschworen; r.* the English vocables cognate with *baut; s.* the rincipal parts of *darfst* (4), *zeigen* (4), *erkennst* (6), *sieht an* 10–11), *geschworen* (12), *erwarten* (13).

3. Who is meant by "*den höchsten in der Christenheit,*" and why was he so styled?

II.

1. *Translate,* (Act II, sc. 1) from "Ja, ich verberg es nicht," to "Auf deinem eignen Erb und freien Boden."

2. Give *a.* the English cognate of *berg* in *verbergen* and other words in which *g* is similarly represented in English; *b.* the derivation of *Fremdlinge; c.* the cognate of *schelten; d.* the reason why the Eng. pers. pron. *I* consists of a long or dipthongal vowel while *i* in *ich* is short; *e.* the cognate of *edle; f.* the derivation of *Jugend* and the concrete noun in German corresponding to it; *g.* the origin of *-s* in *rings; h.* the etymology of *Ehre; i.* other words derived from the same stem as *sammeln; j.* the etymology of the noun *Habsburg* and the historical importance of the place; *k.* the difference in signification between Germ. *still* and Eng. *still; l.* the derivation of *geschehen; m.* the etymology of *Welt; n.* the use of *Ge-* in such words as *Getön* (12) and *Geläut* (16); *o.* the significations and plurals of *der Heerd* and *die Heerde; p.* the force of *ver* in *verführt* (17) and *verachte* (18); *q.* the reason for the form *Geburts* in *Geburtsland; r.* the rule by which "*schäme dich!*" is translated "be ashamed!"; *s.* the rule for the omission of the inflectional ending in *uralt; t.* the cognates of *kaufe* in *verkaufe; u.* the 2d pl. imper. of *nimm* and its Eng. cognates; *v.* the cognate of *werd,* of *Knecht* in *Fürstenknecht; w.* the principal parts of *schelten* (3), *liegen* (6) and its causal, *verlieren* (8), *geschehen* (9), *ladet* (13—old and new), *dringt* (14) and its causal, and *verführt* (17).

3. Who are meant by the *Fremdlinge* (2)?

III.

1. *Translate,* (Act. III, sc. 3) from "Lasst es genug sein, Herr!" to "Dem's Herz nicht in die Hand tritt noch ins Auge."

2. Give *a*. the composition of ***unmenschlich*** and the etymology of its stem; *b*. the grammatical term used in explaining the difference in form between ***durch*** and its Eng. cognate; *c*. the derivation of *Schuld; d*. the government of ***kennen***; *e*. the use here of the form *lernen; f*. the government of ***Stunde***; *g*. the prepositions and cases by which ***denken*** may be followed; *h*. the derivation of *öffnet; i*. the etymology and cognate of *Gasse*; *j*. the cognates of *Frisch*; *k*. the etymology of ***gnädig***; *l*. the etymology of *Geschick* and any other noun of the same stem; *m*. the difference between *der* (13) and *den* (14); *n*. the derivation of ***Spruch*** and the reason why its radical vowel is *u*; *o*. the etymology of *sicher* and its cognates; *p*. the government of ***Blicks*** and its cognate; *q*. the principal parts of *gilt* and its cognate; *r*. the etymology of *Kunst*; *s*. the cognate of *auch*; *t*. the difference in form between *andrer* and its cognate; *u*. the grammatical character of *mir* in line 19.

IV.

Give *a*. the different reasons for the inversion of sentences; *b*. the etymology of the words *Freund* and *Feind*; *c*. the rule for the formation of the pret. subj. of strong verbs; *d*. the rule for the employment of the superlative adj. as predicate and adverb; *e*. some of the nouns derived from the verb *binden* with their genders and plurals.

V.

1. Give *a*. the dates and places of Schiller's birth and death; *b*. the time of his birth as compared with that of Goethe and of Lessing; *c*. the date of the composition of "Wilhelm Tell"; *d*. the names of Schiller's principal other dramas and the country in which the scene of each is laid.

2. Draw a rough map of the scene of "Wilhelm Tell," indicating the position of the lake, the cantons and places mentioned in the drama.

III. GERMAN LITERATURE.—PROFESSOR BOYESEN.

FIRST AND SECOND TERMS.

I.

1. Name the still existing monuments of the Gothic language.
2. State what is known concerning the Gothic translation of the Bible.
3. Name the most important works written in the Old High German language (*Althochdeutsch*).
4. Give the names of the principal actors in the Nibelungen Lied and a brief outline of the plot.
5. Give a brief æsthetic analysis of the Nibelungen Lied, and point out its characteristic excellencies and deficiencies as compared with the Epic of the Greeks.

etch rapidly the story of Gudrun.
re the titles of the old German poems which deal with the
an legends and the Holy Grail.

II.

ve the names of six of the most prominent Minnesingers
known as authors of still existing Epics.
scribe the Minnesinger period in its historic and literary
as compared with the Meistersänger period.
ate what you know about Walter von der Vogelweide, and
ist of the writings commonly attributed to him.
ve a brief account of the life of Ulrich von Liechtenstein.
escribe the metrical structure of the Minnesong as com-
vith the Minne-lay.
efine the literary tendencies of the fourteenth and fifteenth
es.
ate what you know about Hans Sachs.
ame the German satirists of the sixteenth century and give
f their most important works.

IV. GERMAN LITERATURE.—THIRD TERM.

III.

h student is required to answer any ten consecutive ques-

escribe briefly the literary character of the seventeenth cent-
represented by Opitz and his school.
ate what you know about the institutions in Germany, cor-
ling to the Italian Academies of the fifteenth and sixteenth
es. Trace their influence upon literature.
ention the more prominent poets of the three Silesian
.
'hat is the character of the writings of Lohenstein and Hof-
valdau?
'hat were the principles involved in the controversy between
ied and Bodmer? Sketch rapidly the history and the re-
the struggle.
race the development of the German novel (*Roman*) through
enteenth and eighteenth centuries.
ive a concise account of the life and literary activity of Klop-

ive a complete list of Lessing's works, and the dates of his
id death.
im up briefly the intellectual results of Lessing's life, define
iciples for which he fought; his merits and his deficiencies
imatist.
Vhat is understood by the Period of Enlightenment (*Auf-*
r)?
Vhat are Wieland's characteristics as a man and an au-

12. State the leading traits of the Storm and Stress (*Sturm und Drang*) Period. What were its causes and what its results?
13. What were the ideas, foreshadowed or distinctly stated in Herder's writings, which have proved so fruitful to the science and literature of the present century?
14. Name those works of Goethe which are usually regarded as products of the Storm and Stress Period.
15. Give a rapid sketch of the life of Friedrich von Schlegel.
16. Give a criticism of Heinrich Heine as a lyric poet.

ICELANDIC.—PROFESSOR FISKE.

I.

Translate the following passage from the *Gunnlaugs Saga Ormstungu* (Section 11):

Nú búast menn til boðs um vetrinn. Þorkell frá Skáney bauð Illuga svarta ok sonum hans. Ok er Illugi bóndi bjóst, þá sat Gunnlaugr í stofu ok bjóst ekki. Illugi gekk til hans ok mælti:—"Hví býst þú ekki, frændi?" Gunnlaugr svarar:—"Ek ætla eigi at fara." Illugi mælti:—"Fara skaltu víst, frændi!" segir hann, "ok slá ekki slíku á þik, at þrá eptir einni konu, ok lát sem þú vitir eigi, ok mun þik aldri konur skorta." Gunnlaugr görði sem faðir hans mælti; ok kvámu þeir til boðsins, ok var þeim Illuga ok sonum hans skipat í öndvegi, en þeim Þorsteini Egilssyni ok Hrafni, mág hans, ok sveitinni brúðguma í annat öndvegi gegnt Illuga. Konur sátu á palli; ok sat Helga hin fagra næst brúðinni, ok renndi opt augum til Gunnlaugs; ok kemr þar at því sem mælt er, at *eigi leyna augu, ef ann kona manni.* Gunnlaugr var þá vel búinn, ok hafði þá klæðin þau hin góðu, er Sigtryggr konungr gaf hónum; ok þótti hann þá mikit af bragð annarra manna fyrir margs sakir, bæði afls ok vænleiks ok vaxtar. Lítil var gleði manna at boðinu.

1. *Give the principal inflectional parts of* búast, bauð, gekk, svarar, fara, skal, þrá, lát, vitir, görðu, kvámu, sátu, ann, *and* þótti.
2. *The derivation of* bóndi, frændi, ekki, eigi, aldri, mælti, öndvegi, leyna, af bragð, *and* gleði.
3. *The composition of the names* Þorkell, Gunnlaugr, *and* Illugi.
4. *Inflect through all cases of the singular and plural the phrase* Helga hin fagra.
5. *Explain the use of the pronoun in the phrase* þeim Þorsteini Egilssyni ok Hrafni.
6. *Give an account of the word* guma *in* brúðguma.
7. *What makes the vowel in* nú *long?*
8. *Give the changes caused by the* i-*umlaut and the* u-*umlaut, and illustrate them as fully as possible from the above passage.*

II.

Translate from *Hómers Odysseifsdrápa* (Book ix):—

En er sól var runnin og rökkur á komið, lögðum vér oss til svefns sjávarströndinni. En er hin árrisula, rósfingraða Morgungyðja om í ljós, setti eg þing, og mælti í áheyrn allra :—" Mínir kæru élagar! þér skuluð nú vera hér eptir, en eg ætla að fara með skip nitt og lagsmenn mína, og vita, hverir menn þetta eru, hvort þeir ru ofstopamenn, villimenn og ójafnaðarmenn, eða gestrisnir menn g guðhræddir." Að því mæltu steig eg á skip, og bað förunauta nína fara upp í og slá skutfestum. þeir gengu þegar á skip og settust á þópturnar; og þegar hver var kominn í rúm sitt, lustu þeir árum hinn gráa sæ.

1. *Make a list of the words which would be differently spelt in Old Icelandic.*
2. *The principal parts of* runnin, setti, steig, bað, slá *and* lustu.
3. *The English cognates of* svefn, félagar, steig; *the German cognates of* nauta *in* förunauta *and of* og.
4. *Inflect* sjávar *in* sjávarströndinni.
5. *Explain the form* settust *and the derivation of the suffix.*
6. *Give the various possible significations of* á *as particle, verb, noun, etc.*

III.

Write out in prose the following stanza, and translate:—

Mana gramr við mik
(Venr hann gjöfli sik
þess man grepp vara)
Gullhring spara.
Segi hildingr mér,
Ef hann heyrði ger
Dýrligra brag;
þat er drápulag.

1. Give the name of this measure and explain its construction.
2. Explain fully the suffix *a* in *mana.*

IV.

Point out the *hendingar* and alliterative letters in the following:—

Lagðak orms at armi
Arms góða mér tróðu
(Guð brá Lofnar lífi
Lins) andaða mína.
þung var þorna spangar
þraut, en humra brautar
þó er beiðanda biða
Bliks þungara miklu.

1. What is the name given to the above measure?
2. What name is given to the verse in the stanza beginning

Roðit er sverð, en sverðan
Sverðrögnir mik gerði—

V.

1. *Write a brief résumé of the* Gunnlaugs Saga.
2. *Give the principal dates and incidents in the life of* Ari Þorgilsson; *of* Snorri Sturluson; *of* Sturla Þórðarson.

IV. ANGLO-SAXON AND ENGLISH LITERATURE.—PROFESSOR CORSON.

I. ANGLO-SAXON.

Give synopses of case-endings of the three declensions of nouns and of the definite and the indefinite declensions of adjectives. Give the plurals fisc, dæg, cræft, beáh, wíf, sceáp, heafod, bebód, fæt, spere, and the rules they follow. Decline bóc, bróðor, burh, cú, lús, mann, modor, turf, sunu. Decline, definitely and indefinitely, smæl, glæd, fæst, fæger, éce, grim, hálig, heáh, hræð. Compare strang, eald, geong, sceort, sófte, heáh, yfel, mycel, lytel. Decline, as possessive adjective pronouns, the genitives singular, dual, and plural, of the personal pronouns ic and þú. Give synopsis of the inflections of strong verbs. Give the parts of the verb that have the same root-vowel. Give the changes the root-vowel of the 1st pers. pres. indic. undergoes in the 2d and 3d pers. when the vowel of the endings -est and -eð is syncopated, and give the euphonic consonantal changes and omissions which then take place. Conjugate beorgan, yrnan, ceósan wesan, beón, dón, willan, habban, ágan, cunnan, witan. Give synopsis of the inflections of weak verbs. State peculiarities of the different classes of weak verbs and the euphonic consonantal changes and omissions which their conjugations present. Explain and give several examples of the use of the dative infinitive.

Read and Translate:

He sæde ðæt Norð-manna land wære swýþe lang and swíðe smæl. Eal þæt his man áþer oððe ettan oððe erian mæg, þæt lið wið ðá sæ; and þæt is þeáh, on sumum stówum, swýðe clúdig; and licgað wilde móras wið eástan, and wið upp on emnlange þæm bynum lande. On þæm mórum eardiað Finnas; and þæt byne land is eásteweard brádost, and symle swá norðor swá smælre. Eástewerd hit mæg bión syxtig míla brád, oþþe hwéne brædre; and middeweard þritig oððe brádre; and norðeweard, he cwæð, þær hit smalost wære, þær hit mihte beón þreora míla brád tó þæm móre; and se mór syðþan, on sumum stówum, swá brád swá man mæg on twám wucum oferféran; and, on sumum stówum, swá brád swá man mæg on syx dagum oferféran.

Explain construction of "his," in "Eal þæt his man." Explain "áþer oððe . . oððe; wið upp on emnlange; symle swá norðor swá smælre." What modern English phraseology is derived from A. S. construction like "syxtig míla brád?" Explain "hwéne."

2. CHAUCER.

1. Give the usual noun-declensions of Chaucer's English.

2. How is the definite form of adjectives distinguished from the indefinite? Give examples of the two forms. What definite adjectives are generally used without the distinctive endings? Examples. What is the usual plural form of adjectives? What adjectives usually drop the distinctive plural ending?

3. Give the usual inflections of weak verbs in the indicative mood, pres. and past tenses. What verbs end in *-t* in the third person sing.? Examples of each.

4. How do strong verbs form their past tense and their past participles? Past plural? Examples of each.

5. Give the inflections of the subjunctive mood, pres. and past tenses, sing. and pl.

6. Inflections of the imperative mood, sing. and pl.? Give examples. Infinitive endings? Examples. Which of the infinitive endings is most used? What generally determined the use of the other endings?

7. What two participial endings were in use in the English of the XIVth century? Which was generally used by Chaucer, and which by Gower?

8. How are adverbs formed from adjectives? from nouns? What is the usage of the language in regard to the employment of negatives, especially when emphatic? Give examples of the negative united with the verb.

9. In what respect did the accentuation of the English of the XIVth century differ from that of the present English?

10. State the various endings and inflections of the Anglo-Saxon of which the final *-e* of Chaucer's words is a residual or a representative.

11. What are the general rules in regard to the syllabic value of the final *-e* in Chaucer's verse?

12. Scan the following verses, and explain where the final *-e* is sounded, and where it is mute:

V. 38. To telle yow alle the condicioun.
53. Aboven alle naciouns in Pruce.
90. All ful of fresshe floures, white and reede.
102. At that tyme, for him lust ryde soo.
132. In curtesie was sett al hire leste.
148. But sore wepte sche if oon of hem were deed.
183. And I seide his opinioun was good.
221. Full sweetly herde he confessioun.
235. And certayn he hadde a mery noote,
249. And overal, their eny profyt schulde arise.
311. A Sergeant of Lawe, war and wys.
341. An househaldere, and that a gret, was he.
385. He cowde roste, sethe, broille, and frie,
Make mortreux, and wel bake a pye.

417. He kepte his pacient wondurly wel.
535. And thanne his neighebour right as himselve.
557. His nose-thurles blake were and wyde.
A swerd and a bocler baar he by his side.
567. A gentil MauncIple was ther of a temple.
767. For trewely comfort ne merthe is noon.
823. Ye woot youre forward, and I it you recorde.

III. ENGLISH LITERATURE.

NO. I.

[*Each student will receive four or five connected questions, the answers to which are to be embodied in an Essay written during examination hours. The literary merits of the Essay, as well as the correctness and fullness of the answers given, will be taken into account.*]

1. Name the chief literary productions of the 14th century that claim the student's special attention.

2. What is the character of the Vision of William concerning Piers the Plowman? In what does its great historic value consist?

3. What dogma of the church was the special object of Wyckliffe's condemnation?

4. What are the literary merits of the Wyckliffite versions of the Scriptures?

5. What previous attempts at vernacular translation had been made in England?

6. What influence was exerted by the Wickliffite versions, upon subsequent versions?

7. What noteworthy circumstance in the history of the literatures of Protestant countries, is connected with the translation of the Scriptures into the vernacular?

8. What qualifications did Chaucer possess for becoming a great national poet?

9. What were the chief obstacles to his continued popularity, after the close of the 14th century?

10. What dramatic advantages has the plan of the Canterbury Tales over that of the Decameron of Boccaccio?

11. How is the literary dearth of the 150 years succeeding the death of Chaucer, to be partially accounted for, and upon what was the best productive mind of the nation during that time chiefly expended?

12. Who were the principal poetic representatives of this period? State what you know about them and their works.

13. What are the claims of the Earl of Surrey to his rank in English literature?

14. What is the character of "The Mirrour for Magistrates"? By whom was it planned and what did he contribute to it?

15. In what grand respect did Spenser differ from his cotemporaries and his immediate successors, especially Shakespeare?

16. Define the terms Classical and Romantic as applied to the two schools of literary art which, in Spenser's time, in England and on the continent, were struggling for the ascendency.

17. How may the Faerie Queene be characterized in respect to its relation to the two schools of literary art, the Classical and the Romantic?

18. What influence has been exerted by Spenser on English poetry, and in which of the modern poets is his influence most apparent?

19. State the chief distinguishing characteristics of Shakespeare's dramatic art.

20. In what does his great superiority to Jonson in the delineation of character, chiefly consist?

21. Upon what principle does Shakespeare seem to have proceeded in always working upon the basis of a previously existing story or play? And in thus working, how does his genius especially show itself?

NO. 2.

1. Give the four distinct periods into which Milton's authorship may be divided.

2. What were Milton's views as to the qualifications of a great poet?

3. State Macaulay's theory as to the requisites of success in the exercise of poetic genius.

4. What do you understand by a poetic reflection of an age? And why are great poets the truest historians?

5. What is it that makes Milton the great central figure of his age?

6. Compare Dryden with Milton as a reflector of his age.

7. Give an account of "the Collier Controversy."

NO. 3.

1. What was the occasion of Pope's Rape of the Lock? What were Pope's models in its composition?

2. State the relations of the poem to Pope's time.

3. In what form of poetry did the spirit of his age find its best embodiment?

4. Give an account of the Ossian controversy.

5. What good influence was exerted upon English poetry by Bishop Percy's Reliques?

6. State as fully as you can what you consider Cowper's relations to have been to the great revival in English poetry.

7. Trace succinctly the progress of the revival and the opposition it met with up to its culmination in Wordsworth.

4. CRITICAL READING.

MILTON'S LYCIDAS.

Give the occasion of the composition of the poem, and analyze its structure. Explain as minutely as possible the ecclesiastical allegory running through it. In what different senses have the five opening lines been understood? v. 1, force of "yet?" v. 3, "crude," original meaning? What other English word has the same root? v. 6, "sad occasion dear;" give several other examples from Milton of this arrangement of epithets. Explain "dear." Give examples from Shakespeare of this use of the word; Craik's explanation? Horne Tooke's etymology? v. 7, "Compels," why used in the singular? "to disturb your season due?" Explain. v. 8, "Lycidas;" where did Milton get this name for his shepherd, and why did he probably choose it? Etymological meaning of the name? v. 11, "rhyme;" correct etymology of the word? Why was the "h" introduced in the spelling? v. 13, "welter;" etymology of word? What other English verbs have the same root? "to," force of? Give other examples from the poem, of this use of the word. In what present English phrases is it still so used? v. 14, "melodious tear," explain. v. 20, "lucky words;" explain the epithet. v. 22, "sable shrowd," explain; etymology of "shrowd?" v. 23, *et seq.*, explain biographical allusion. v. 33, "oaten;" what form have adjectives in -en given place to in present English? What change in meaning have those that are retained, undergone? v. 38, "must," force of? v. 47, "wardrop," what is the usual order of the elements of a compound word? How is the order in "wardrobe" accounted for? v. 49, "such," force of? v. 55, "wisard," propriety of the epithet? original force of -ard? usual present force? Give other examples. In what word has it been corrupted? v. 59, "inchanting," explain the epithet. v. 61, "the," force of? v. 64, "boots," etymology of word? "uncessant." What is the present rule in regard to the use of un- and in-? v. 64–69, explain the allusion. v. 67, "use," modern use? v. 75, "Fury," how does the poet use the word here? v. 76, "life," what figure? v. 79, "in the glistering foil," construe. v. 81, "by," force of? v. 82. "perfet," explain the form. v. 85, "honour'd," explain the epithet. vv. 87, 88, explain. v. 90, "in Neptune's plea," explain. v. 93, "every," etymologically = what? difference between the uses of "each" and "every?" v. 97, "was stray'd," what distinction was formerly observed in the use of *be* and *have* as auxiliaries? Difference between "is come" and "has come?" v. 101, "th' eclipse," force of "the?" "with," force of? v. 103, "went," what would be used in present English? Derivation and original sense of "went?" v. 104, what is the allusion? v. 106, "Like," construe. v. 110, "twain," three uses of, in Elizabethan English? v. 111, "amain," etymology, and force of the word here? v. 112 "bespake," give other examples from Milton of this use of the word; what force has be- in present English? v. 114, "Anow," difference, originally, between the use of "enow" and "enough?" v. 119, "Blind mouthes!" Is Hale's explanation acceptable? What other explanation would make the expression more poetic? v. 120, "the least," construe. v. 121, "faithfull," what has probably caused the dropping of one l in present spelling? v. 123, "list," its derivation and earlier use? In what word does it survive? And to what other word is it akin? v. 126, "draw," in what form is the word still used in this sense? v. 129, "and nothing sed," explain construction of this phrase. vv. 130, 131, to what are these two lines generally understood to allude? but what is their more probable meaning? vv. 132, 133, "Return, Alpheus, ... return, Sicilian Muse," explain. v. 134, "bid them hither cast," what is involved in "hither?" v. 138, "swart star," force of epithet? v. 140 "quaint," etymology, and force of here? v. 142, "rathe," what form of this word is still in use? What other form is found in Shakespeare and earlier writers? Where has Tennyson used "rathe?" v. 149, "his:" give history of the present neuter genitive "its." v. 151, "laureat herse," explain "herse," and give examples of its earlier use; explain the epithet. v. 152, "so," force of? v. 158, "monstrous" =what? v. 159, "moist vows," develop; v. 160, "fable of Bellerus old," what rhetorical figure? vv. 161–163, explain the ecclesiastical meaning of these lines; "ruth," in what modern English word does it survive? in what verb? explain the form. v. 166, "your sorrow," what rhetorical figure? Give examples of other abstract nouns used in a concrete sense; examples from the Latin and Greek; v. 173, "that walk'd the waves," after what class of intransitive verbs was it common in Elizabethan English to omit the preposition? Give examples from Shakespeare. What difference in meaning is there in "walk'd the waves" and "walk'd on" or "walk'd o'er the waves?" Which is the more poetic, and why? v. 176, "unexpressive," explain the use of adjectives in -ive and -ible, in Elizabethan English, and give examples, from Shakespeare, of such adjectives used in a passive and in an active sense; v. 184, "thy," personal, or possessive adjective pronoun? "good," force of? Any like use in modern English? v. 185, "that wander in that perilous flood," what force has "in" here, different from what "on" or "o'er" would have? v. 186, "uncouth," radical and derivative meanings? meaning here? v. 189, "thought," force of? "Dorick," explain the epithet; v. 190, "stretch'd out all the hills," explain; what equivalent expression in Virgil's Eclogues? v. 192, "twitch'd," explain; "blew," why this epithet? v. 193, explain this verse.

V. MATHEMATICS.

[*The subjects in this department are distributed among the several Professors differently during successive years.*]

I. ALGEBRA—PROFESSORS BYERLY AND WAIT.

1. Find all the commensurable roots and one incommensurable root of the equation $x^5 - 4x^4 + 13x^3 - 47x^2 + 80x - 44 = 0$.

2. Find a formula for the sum of n terms of an arithmetical progression by making it depend on the $(n+1)$st term of a new series, and show that your formula is identical with the one found by the usual process.

3. Find the logarithm of 8608; interpolating in your table by the aid of the formula for the $(n+1)$st term of a series.

4. Develop $\sqrt{1+x}$ into a series by the binomial theorem, and also by the method of undetermined coefficients.

5. Compute the logarithm of .002, to the fourth approximation by the method of continued fractions.

6. Calculate by logarithms the value of the expression

$$\sqrt[10]{\left[\frac{(4.275)^3 + \sqrt[4]{26.41} \times 0.0832}{0.09628 \times \sqrt{\frac{623}{1785}}}\right]^7}$$

2. TRIGONOMETRY—PROFESSORS ARNOLD AND WAIT.

1. Define the six principal trigonometric functions of ϑ, as *ratios* and extend the definitions to the case of angles $<0°$ and $>90°$. Find eight fundamental relations among them, *for all values of* ϑ. Obtain $\sin\vartheta$ in terms of $\tan\vartheta$.

Show what lines, drawn to a circle whose radius $=1$, have the same values as the trigonometric functions or ratios. In what sense can a line and a ratio be said to have the same value?

Write out the six functions of $-\vartheta$, $\frac{1}{2}\pi \mp \vartheta$, $\pi \mp \vartheta$, $\frac{3}{2}\pi \mp \vartheta$, $2\pi \mp \vartheta$, $-5\pi \mp \vartheta$, in terms of those functions of ϑ which express them most simply. What relation has this problem to the mode of using trigonometric tables?

Give the six functions, also versin, coversin and suversin, of the following angles: 0°, 60°, 120°, 225°.

2. Write formulæ for $\sin(\alpha \pm \beta)$ and $\cos(\alpha \pm \beta)$. How do you know that these formulæ are true even when α and β are not between 0° and 90°? Illustrate by the case of $\sin(\alpha+\beta)$.

Proceeding from these, find formulæ for $\tan\frac{1}{2}\vartheta$ and for

$$\frac{\sin\gamma + \sin\delta}{\sin\gamma - \sin\delta}.$$

3. In quadrilateral $ABCD$, let $AB = 80$, $BC = 70$, $CD = 60$, $DA = 50$, $AC = 40$; and find BD. Use four-place logarithms; and estimate, roughly, the degree of accuracy in your result.

4. State Napier's rules for spherical right triangles; and demonstrate, using Evans's method.

5. Find, in nautical miles, the length of the shortest path from a point off Cape Horn, in 57° S. lat. and 67° W. long., to a point in 43° 15′ S., 147° 30′ E. off Hobarton. In sailing upon this track, how must I steer at first?

3. PLANE ANALYTIC GEOMETRY.

1. The centre of gravity of two heavy points is known to divide

internally the line that joins them, in the inverse ratio of their weights. Let the points P_1, P_2, P_3 have the weights m_1, m_2, m_3; and let the point P_{23}, at the centre of gravity of P_2 and P_3, have the weight $m_2 + m_3$, and similarly with P_{31} and P_{12}. Prove that P_1 and P_{23} have the same centre of gravity as P_2 and P_{31}, or as P_3 and P_{12}.

What properties of plane triangles can you deduce from this; and what theorems concerning centres of gravity for many bodies?

2. Rectangular equations of two lines; the first containing point $(-2, 3)$ and making the angle $-45°$ with axis OX; the second, containing points $(2, 3)$ and $(-4, -6)$.

Distance of each line from the origin; intercepts on the axes; distance of the lines' intersection from point $(1, 1)$; tangent of their angle of inclination.

Transform the lines' equations to oblique coordinates whose axes make angles $+30°$ and $+60°$ with OX, and whose origin is $(1, 1)$; also to polar coordinates whose origin and axis are O and OX.

3. Rectangular and polar equations of the circle that contains points $(0, 0)$, $(1, 7,)$ $(7, -1)$. Show when its radius vector becomes negative, and interpret this result.

4. Prove that the tangent at any point of an ellipse or hyperbola is equally inclined to the two lines from that point to the foci. What is the corresponding theorem for the parabola, and why?

5. Prove that every equation of the second degree represents an ellipse, a parabola, a hyperbola or right lines.

6. Through a fixed point O passes a moving line that cuts a given hyperbola in points P', P''. Find locus of that point P on the line, which divides $P'P''$ harmonically with respect to O.

4. SOLID ANALYTIC GEOMETRY—PROFESSORS BYERLY AND WAIT.

1. Find, by projections, the cosine of the angle between two lines, in terms of the lines' direction-cosines.

2. Write the equation of the plane, in four of the most important and dissimilar forms; interpret each, and show whether it extends to oblique coordinates, and how obtained.

3. Find the shortest distance between two non-intersecting diagonals of adjacent faces of a given cube.

4. Locus of equations $U = V = W = 0$; of $U = VW = 0$; of $U + k.V = 0$; of $UV + mUW + nVW = 0$; where $U = 0$; $V = 0$, $W = 0$ represent any surfaces.

5. Classify the surfaces $Ax^2 + By^2 + Cz^2 + 2Lx + 2My + 2Nz = 0$, by referring to new coordinate axes so as to simplify their equations.

5. HARMONOID GEOMETRY.

(Use symmetric methods by preference.)

1. *By theory of permutations,* how many essentially different

harmonoid ratios are determined by four given elements? Show that each of these ratios fixes all the others unambiguously; and utilize this in defining homography.

Show that either harmonoid of a pencil, if defined by the aid of the sines of the angles, is independent of the choice of positive direction on either ray; and that the above discussion applies to such harmonoids.

Prove that a pencil of $2n$ rays cuts any transversal homographically. Resulting theorem for two pencils or ranges, and its converse. Cases where one intersection is at infinity, and where two corresponding elements are identical. Methods of completing a pencil or range homographically to another.

2. Distinguish descriptive from metric relations. What classes of either are projective, and why?

Prove that any four tangents to a conic meet any fifth tangent in a range homographic to the pencil of rays that join the four points of contact to any fifth point on the curve.

3. Obtain and reciprocate Pascal's theorem.

Given five points on a conic, draw a tangent at either; also find where the conic meets a given line through either point. Reciprocate these problems.

Through a given point, draw a line to the unseen intersection of two given lines.

4. Establish the fundamental theorems of involution by Evans's method, from the properties of the completed quadrilateral.

6. CALCULUS—PROFESSOR OLIVER.

ONE-TERM COURSE.

1. Define Curvative, Osculating Circle, Radius of Curvature, Centre of Curvature, Evolute. What are the two most important properties of the evolute of any curve?

2. Find the length of the radius of curvature of the curve $x^2 = 4y$ at the point whose abscissa is 2.

3. Find at what point of the curve $x^2 = 4y$ the radius of curvature will be a minimum.

4. Give the reasoning in full of the method of determining by integration the centre of gravity of a parabolic segment.

Example.—Find the coordinates of the centre of gravity of the segment of the parabola $y^2 = 2mx$ cut off by the double ordinate through (x_1, y_1).

7. CALCULUS—PROFESSORS OLIVER AND BYERLY.

FULL COURSE, EXTENDING THROUGH THREE TERMS.

1. Explain the terms "limit," infinitesimal," "order of infinity," "*derivative*," "differential" or "virtual increment," "difference" *or "increment."*

Compare the method of limits, that of infinitesimals, and Lagrange's; and show that all three are rigorous.

Show that integration, defined as a certain limiting case of summation, is the inverse of differentiation. Explain its relation to the arbitrary or undetermined constant, and the theory of definite integrals.

Likewise illustrate all the above topics by aid of a curve, or of a moving point.

2. Show that $\lim\ (1 + i)^{\frac{x}{i}}$ can, by assigning a suitable law to the infinitesimal i, be developed by the binomial theorem for positive integer exponents; and that it converges.

Obtain the derivative of ε^x; of $\log x$.

3. Differentiate $\sin^{-1}\dfrac{a+b \sin 3\sqrt{x}}{b+a \sin 3\sqrt{x}}$.

4. Express $D_x{}^3y$ in terms of derivatives of x with respect to y.

5. Write Taylor's Theorem in two forms. Develop $\sin x$ and $\cos x$. Obtain De Moivre's formulæ, and describe the six hyperbolic functions.

6. Investigate the conditions for a maximum or minimum in a function of two variables. Apply to the function $xy(1 - 2x - 3y)$.

7. Prove that at any point of a surface the sum of the curvatures of mutually perpendicular normal sections is constant.

8. Integrate $\dfrac{dx}{a^2-x^2}$ into both logarithmic and hyperbolic forms.

Obtain the integral $\int\dfrac{dx}{x} = \log x + C$ from the general form of $\int x^m dx$.

9. Integrate $\dfrac{2+3x}{(x^2-x+1)^2}\,dx$.

10. Show how to integrate every rational function of x and $\sqrt{(ax^2 + bx + c)}$, by introducing an auxiliary angle.

11. Show when $x^m(a + bx^n)^p dx$ is integrable. Explain the methods of reduction by which either m or p can be increased or diminished.

12. Integrate $(ax + by + c)dx + (a_1x + b_1y + c_1)dy = 0$.

13. Obtain the singular solution of equation $a^2(dy^2 + dx^2) = (ydx - x\,dy)^2$; and explain the relation of singular solutions to envelopes.

14. Find the orthogonal trajectories of the system of circles with a common chord, $y^2 + x^2 x - 2a = b^2$; where a varies.

8. DESCRIPTIVE GEOMETRY.

[*Students, in all the courses, are admitted to the class in Descriptive Geometry as optional students. But the study is required in the course in* ARCHITECTURE, CIVIL ENGINEERING, *and in* MECHANIC ARTS. *The subject is taught under the supervision of the Professor in Civil Engineering.*]

I. FIRST TERM.

2. Find the angle an oblique plane makes with the ground line.
3. Through a line draw a plane perpendicular to a given plane.
6. Draw a plane tangent to a cone and parallel to a given line, the axis of the cone being in the ground line.

II. SECOND TERM.

1. Find the projections of a cone, having a circular right section, when taken oblique to the planes of projection; and the development of the surface between the vertex and the horizontal plane.
2. Find the intersection of a plane with a cylinder having its axis in the ground line.
6. Given one element of the first, and three of the second generation, of a hyperbolic paraboloid—the element of the first generation passing through the vertex of the surface—and a plane, containing the element of the first generation; to find the point where the plane is tangent to the surface.
7. A village lot is divided into squares, and the references of the corners determined; find the cut or fill at each corner, and the number of cubic yards of earth to be removed to reduce the surface to a given uniform grade.
9. Through a line pass a plane perpendicular to a given plane and find its scale of declivity.
10. Draw a normal line to the skew arch soffit at a given point of the surface.

VI. NATURAL HISTORY.

I. PHYSIOLOGY—PROFESSOR WILDER.

1. State the chemical resemblances and differences between butter and sugar.
2. State the general object of digestion.
3. State the functions of the pancreatic juice.
4. Define tidal air and state its average amount.
5. Make a diagram of gray and white nervous tissue: state where they occur and their properties.
6. State the difference between plasma and serum.
7. Give a diagram of both sides of the heart; indicate the source, nature and destination of the blood currents.
8. Give a diagram of the hepatic circulation; indicate the source, nature and distribution of the blood, and the changes produced by the liver.
9. State the difference between coma and syncope, and indicate their treatment.

10. Name three common clothing stuffs in the order of their protection against cold.
11. Give a diagram of a vertical section of the skin.
12. State the effect of irritating the anterior root of a spinal nerve *inside* of a section through it.
13. Name the essential ganglia of the brain in their order from behind forward.
14. Give a diagram of the tympanum and its contents.
15. State the structure, position and properties of the "blind" and the "yellow" spots upon the retina.

2. PHYSIOLOGICAL BOTANY—PROFESSOR PRENTISS.

1. What are the essential characters of a typical flower?
2. Explain the theoretical structure of the pistil.
3. Distinguish between free and distinct, cohesion and adhesion, pinnate and pinnatifid.
4. Explain the structure of a flower of Compositæ.
5. In what plant is the greatest amount of pollen secreted? Why?
6. What is assimilation? Where and under what conditions does it take place?
7. Show that a flower is homologous with a branch.
8. State some of the distinguishing characteristics between Trillium grandiflorum and T. erectum.
9. Mention ten trees indigenous to New York, and state the Natural Order to which each belongs.
10. What change in structure would convert a raceme into a corymb?
11. State the leading botanical characters of each of the following orders: Rosaceæ, Leguminosæ, Crucifera, Ranunculaceæ.
12. Define Genus, Species, Order. State the origin of generic, specific, and ordinal names.
13. Draw diagrams to show: 1. Ovary free. 2. Ovary adherent. 3. Excurrent stem. 4. Versatile anther. 5. Introse anther. 6. Imbricate æstivation. 7. Valvate do. 8. A petiolate, ovate, cordate, serrate leaf with stipules.
14. Characterize the different kinds of plant tissue.
15. Name six natural orders largely represented in the flora of Ithaca.
16. What are four of the most important orders in temperate regions in regard to their useful products?
17. Explain some structural provisions in plants which aid in their dissemination.
18. What substances constitute the principal food of plants?
19. Describe the different shapes of monopetalous corollas.
20. Explain the terms diœcious and monœcious.
21. Give examples of common diœcious plants.
22. How do *ordinary tendrils act?*

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23. Of what advantage is it to a plant to climb?
24. Explain the general structure of a leaf.

3. ZOOLOGY—PROFESSOR WILDER AND MR. COMSTOCK.

1. What kinds of groups are usually admitted among animals?
2. Characterize the Vertebrates.
3. Characterize *Amphioxus*.
4. Give a longitudinal section of *Amphioxus*.
5. Give a longitudinal median section of the branchial region of *Petromyzon* (the lamprey).
6. Characterize the larval form of *Petromyzon*.
7. Give the geographical distribution of the existing Ganoids, including the Dipnoans.
8. Give in three vertical columns the constant and peculiar characters of the Ganoids, Selachians, and Teleosts.
9. Describe and figure the development of a frog.
10. Describe peculiar forms of gestation among Batrachians.
11. Give a diagram of a frog's brain from above.
12. State the resemblances and differences between Reptiles and Birds.
13. Name fossil forms which seem to connect the two classes.
14. Characterize the Mammals.
15. Give a diagram of an embryo opossum.
16. Name and give an account of the simplest organism known.
17. Describe the development of a free-swimming medusi-form reproductive bud.
18. Give an account of the coral-making *Zoantharia*, noticing especially the following points:—Relation of coral to body of polyp, modes of reproduction, forms of coral communities as resulting from different modes of increase or growth, and the distribution in latitude, and in depth, of the reef-building species.
19. Give an account of the Pork Tape-worm of man, (*Taenia solium*).
20. Characterize the Spiders, (*Araneida*).
21. Give tabular arrangement of the typical mouth-parts of an insect.
22. Explain the terms, larva, pupa, chrysalis, complete metamorphosis and incomplete metamorphosis.
23. Describe a fresh-water Polyzoon.
24. Discuss the zoological position of the *Brachiopoda*.
25. Describe shell of an *Orthoceras*.

GENERAL GEOLOGY—PROFESSOR COMSTOCK.

1. Give concise review of oceanic and atmospheric currents, as influenced by configuration of land.
2. Modes of origin of rocks, with varieties of texture.
3. Explain "cycles of deposition."

4. Give proofs of slow movements in the earth's crust.
5. Outline the prominent theories of mountain elevation.
6. Nature and effects of Metamorphism.
7. Name the geological period in which each of the principal orth American mountain chains was elevated.
8. Causes and effects of hot springs and geysers.
9. Brief resumé of effects produced by organic agencies.
10. Name, in the order of relative importance, the classes of aniıals and plants represented in each geological age.
11. Review briefly the history of the Azoic and Eozoic ages.
12. Brief account of the life of the Trenton Period.
13. Review the life of the Devonian Age.
14. Review the life of the Mesozoic Era.
15. Give the evidence in support of the glacial theory.
16. Classify the epochs of the Pre-Historic Era, showing stratiraphic equivalents, and giving characteristic relics of each epoch,
17. Describe the remains of *pfhlbaaten* and *kjökken-mödding*, iving geographical distribution of both.
18. Give an outline of North American Archæology.
19. Say all you can about the *Champlain Period* in America.

'II. MORAL AND INTELLECTUAL PHILOSOPHY.—PROFESSOR WILSON.

[*The examinations in this Department are conducted by neans of a Syllabus of the lectures on each subject, the questions nd topics of the Syllabus are divided into sets, with five or more n a set, one of which is drawn by lot by each student at the time f the examination, and the answers and discussions are written n the presence of the professor. The following are given as xamples, only two or three from each Syllabus:*]

I. PSYCHOLOGY.

I.

1. What is the relation of the Body to the Mind?
21. What is Materialism in relation to Psychology?
41. What is false perception, and on what conditions may it occur?
61. What are the appetites, and how are they related to the excito-motor emotions?
81. Explain the difference between the æsthetic and the ethic emotions in reference to their origin.
101. What is the difference between volition and choice?

VI.

6. Describe and name the ganglia of the sensorium.
26. Can voluntary action be distinguished from involuntary action by the *mere observer?* *Why not?*

46. What are the reasons for regarding the optic thalami as the organ of the sense of touch?
66. How are affections influenced by the voluntary control of thought?
86. What reason is there to suppose that the emotions of self are influenced by difference of physical organization?
106. State the changes in the character of the life of an individual as he passes from infancy to old age.

XIX.

19. What influence have the excito-motor and the sensori-motor emotions upon the character and habits of life?
39. What would be our condition in relation to knowledge of external objects, if we had no sense of touch?
59. Explain the four processes by which nouns as names of things are formed.
79. What are sentiments? and how do they differ from judgments?
99. Why cannot we prove as a matter of fact that animals have volition?
119. What changes take place in the character of memory as we pass from childhood to old age?

2. MORAL PHILOSOPHY.

[*Each student writes an essay on one of the following topics drawn by lot at the time of writing it:*]

1. The nature and limit of Moral Action.
2. The influence of theories of Morals on character.
3. The Moral character of Acts as distinct from the Guilt or Innocence of the Agent.
4. Reflex-action in its relation to Freedom of Will.
5. Æsthetic Culture and its relation to Morality.
6. Benevolence as a Sentiment and as a Principle.
7. The Duty of Truthfulness and the extent of its obligations.
8. The Duty of Justice as between Man and Man.
9. The Rights of the State as against Subjects.
10. Citizenship as a Natural Right.
11. Religion as a Natural Duty.
12. In cases of conflict of Duties, what general rules may be given as our guide in determining what is our Duty?

3. LOGIC.

I.

1. Explain the nature and province of Logic. What are its relations to Psychology?
21. What is the fallacy of Undistributed Middle? When will it occur? Why can there be no Universal Conclusion after a *Partial* Premise?

41. Explain what is meant by "the presumption," "the probability," and "the certainty of propositions." How many kinds or degrees of certainty are there?
Analyze and explain examples 6, 22, 99.

V.

5. What is synthetic reasoning? Why do we call it *a posteriori*? What are the four relations of things on which it depends?
25. What is a *Sorites?* How may its validity be tested (1) by reduction to syllogisms, (2) by general rules?
45. What are "examples?" what "exceptions?" and their relations to each other? Explain the method and fundamental principle of induction.
Analyze and explain Examples 5, 30, 114.

X.

10. When do separable accidents become essential? When essentia and differentia? What is artificial classification, and how does it differ from natural classification?
30. What are disjunctive syllogisms, and the ways of completing them? What is Excluded Middle?
50. Explain the relation of Logic to Rhetoric, and the difference between them in reference to argumentation.
Analyze and explain Examples 14, 53, 102.

XV.

15. Explain "immediate inference" by composition (§§ 93, 94.) What is the fundamental law in regard to the force of negatives?
35. What is Ambiguous Middle? Give and analyze an example. How does this differ from Undistributed Middle?
55. What is the difference between refuting one's *reasoning* and refuting his *conclusion?* How can the former be done? What is the effect of it?
Examples 18, 39, 115.

XX.

20. What is the Fallacy of Negative Premises? Why may there be no conclusion after two Negative Premises? Why no affirmative conclusion after one Negative Premise?
40. May a syllogism be at the same time a fallacy in form and in diction? What is necessary to detect a fallacy in diction? Why?
60. Explain the difference between direct and indirect refutation. What are the three kinds of indirect refutation?
Analyze and explain Examples 24, 45, 138.

4. HISTORY AND CRITICISM OF PHILOSOPHY.

V.

5. Describe and define the six classes of nouns: (1) individual,

(2) abstract, (3) general, (4) collective, (5) privative, and (6) negative.

25. Give an account of the Sophists; of Socrates; and the origin of the word "philosophy."

45. State Comte's objection to consciousness, as a means of knowledge. What would be the consequence of accepting it?

65. What is meant by the word "*faculty*," as applied to the mind? What influence has the philosophy of Reid had upon this use of words, and the views of the nature of the mind?

85. What is meant by calling God "the Absolute," "the Infinite," etc.? What is the law of the English language, in regard to the use of the article before adjectives? How does it differ from the Greek usage?

X.

10. What is the law with regard to the quality of nouns that may be connected by conjunctions? The reason for it?

30. To what department of Philosophy did Aristotle chiefly devote himself? What was his attitude in regard to Plato's theory of ideas?

50. What is "substance," as distinct from "property"? What are the three significations of the word "substance"?

70. Do we know the mind as object, or as cause only? Explain the difference?

90. What is Cousin's theory of "the origin of the idea" of God? What does he mean by calling God "the Universal Reason"? What inference may we draw from this, as to the nature of God?

XVII.

1. State some of the changes that may be made in propositions and show the analogy between this method and mathematical analysis.

2. What was Kant's theory of knowledge? What was Fichte's application of it to the external world?

3. In what sense is every object in nature "a cause"? in what "a force"? Are "cause" and "force" abstract or concrete terms when so used?

4. What was Cousin's theory of "ideas" in relation to the acquisition of knowledge?

5. Show that every object in nature and every state of an object may be regarded as a term in a series, (1) with regard to organic beings, (2) to inorganic.

XX.

1. State and illustrate the principle of identity and contradiction as a test of truth.

2. What is Sir William Hamilton's theory of knowledge—"presentative" and "representative"? What its relations to the materialism of Herbert Spencer?

3. Are there any "causes" or "forces" in nature besides material objects? What are "laws"—"the laws of Nature"?

4. What proof have we that the mind or soul is immaterial? What is the bearing of this on the doctrine of immortality?

5. What attributes do the acts of "creation" in the origin of "species" and "series" imply in the Beings who performed them? What influence does the certainty of such acts have on our expectations of a Special Providence and miraculous interpositions after creation was completed?

VIII. PHYSICAL SCIENCES.

I. CHEMISTRY.—PROFESSOR SCHAEFFER.

1. Explain the following terms:—atom, molecule, element, symbol, formula, atomic weight, molecular weight, equivalence.

2. What is meant by the law of definite proportion—law of multiple proportion? Give examples.

3. When the same elements unite in more than one proportion how are resulting compounds named?

4. What is a compound radical?

5. What is an acid? a base? a salt? How are they named?

6. What is a normal salt? What an acid salt?

7. Explain the relation between the density of a gas and its molecular weight. Give examples.

8. The molecular formula of a substance being given how may its percentage composition be obtained?

9. Give the distribution, preparation and properties of chlorine and sulphur.

10. Explain the process of combustion.

2. PHYSICS—PROFESSOR ANTHONY.

I. MECHANICS.

1. Define the terms (*a*) force, (*b*) work, (*c*) energy, (*d*) resultant and (*e*) component.

2. Define the terms (*a*) velocity and (*b*) acceleration.

3. A force of 8 kilogrammes acts toward the right, another parallel force of 6 kilogrammes acts toward the left at a distance of 12 c. m. from the first. Determine completely the resultant.

4. When a body is moved by a constant unbalanced force, (*a*) what is the nature of its motion? (*b*) What is the relation of the acceleration to the force and mass? (*c*) What relation between time and velocity acquired? (*d*) Between time and space passed over? (*e*) Between velocity and space?

5. A body A moves in the arc of a circle of 5 ft. radius with a velocity of 30 ft. A body B moves in a circle of one-half the radius with one-half the velocity. What is the ratio between the centrifugal forces developed?

6. (*a*) What is the relation between the ordinary and absolute units of force, if feet and seconds are the units of length and time respectively? (*b*) What if yards and minutes are the units of length and time?

7. What is the resultant of the forces 5 and 7 making an angle of 120°?

8. Find the centre of gravity of a circular disc of which one half is iron and the other half wood, joined along a diameter of the disc, the iron being 8 times as heavy as the wood.

9. (*a*) A mass of 100 lbs. moves with a velocity of 500 ft. What is its energy in ft. lbs.? (*b*) How far would it penetrate into a bank of earth offering a constant resistance of 100 lbs.?

10 How high will a body rise when projected upward with a velocity of 1000 feet?

11. How is the pressure due to the weight of a liquid computed?

12. State the principle of Archimedes.

13. (*a*) State Mariotte's law. (*b*) How can it be demonstrated experimentally?

14. Into what space will a quantity of air measuring 1 cu. ft. at the standard atmospheric pressure be compressed by a column of water 330 ft. high in an open tube (33 ft. = 1 atmosphere)?

II. ELECTRICITY AND MAGNETISM.

1. *a*. Describe the phenomena of statical induction. *b*. Apply to electrophorous and Holtz machine.

2. What are the general laws for the mutual action of electric currents? Apply to the case of a radial current flowing from the centre outward, acted upon by the earth current.

3. A Battery of 40 cells, each of 2 ohms resistance, and E. M. F. 1 volt, is arranged in series and the current divided between three telegraph lines, respectively of 3500, 7000, and 6500 ohms resistance. *a*. What is the entire external resistance? *b*. What is the entire resistance? *c*. What is the entire current? *d*. What current will flow through each line?

4. Describe the experiments to be performed to obtain the strength of a current in absolute measure.

5. *a*. Give the general law for the direction of an induced current. *b*. What current will flow through a vertical wire forming part of a closed circuit, when the wire is moved southward? *c*. When it is moved eastward?

III. HEAT.

1. What is meant by the coefficient of expansion of a body? Coefficient of apparent expansion of a liquid? In a centigrade thermometer, what must be the relation between the volume of the tube between 0° and 100°, and that of the bulb including that portion of the tube below 0°?

2. What is the theoretical velocity of air in a ventilating flue whose height is 50ft. and temperature 27° C., the external temperature being 7° C.?

3. Describe ebullition and the accompanying phenomena. What is the tension of the vapor from a boiling liquid? Effect of pressure on the boiling point. Why?

4. Water is compressed $\frac{45}{1000000}$ of its volume by a pressure of one atmosphere, what force will be required to resist the expansion for an elevation of temperature of 20°? coef. of expansion .00024.

5. Which has the greater density, air at 10° and pressure 70, or air at 30° and pressure 80?

6. What is meant by the "Spheroidal State?" State what facts you know in connection with it.

7. What is the unit of heat? What is specific heat? A body weighing 5 grammes is heated to a temperature of 100°, then plunged into 10 grammes of water at 10°, the common temperature finally reached is 12°. Required spec. heat of body.

IV. ACOUSTICS AND OPTICS.

1. (*a*) What is meant by a musical interval? Compute the intervals between the tonic and each note (*b*) of the major scale, (*c*) of the minor scale. (*d*) Point out the difference between the two scales.

2. Give the evidence that sound is propagated through the air by a vibratory motion.

3. *a*. What are laws of regular reflection of light? *b*. Where is the image caused by reflection from a plane mirror? *c*. Where is the image produced by a concave mirror, if the object is at an infinite distance? *d*. What changes will take place in the position and size of the image produced by a concave mirror, if the object approach from an infinite distance to very near the mirror?

4. *a*. What are the laws of refraction of light? *b*. Show in what way a prism deviates the rays. *c*. What is meant by the minimum deviation by a prism, and when does it occur?

5. *a*. State the evidence in favor of the undulatory theory of light. *b*. What evidence in relation to the direction of the vibration? *c*. How does a thin piece of selenite restore the light when placed between the polarizer and analyzer? *d*. How are the colors in this experiment accounted for?

3. ASTRONOMY—PROFESSOR POTTER.

I. Explain the difference between Sidereal and Solar days.

II. Explain the origin of the elements composing the Equation of time, and show the relation of that Equation to apparent and mean time.

III. Give the amount, and explain the cause of Precession, and show its relation to the Tropical year.

IV. Define the Sidereal, Anomalistic, and Civil years.

V. Show the relation of Aberration to the velocity of light, and to the Earth's orbital motion.

VI. Explain the method of computing the distance of an Inferior Planet by means of its greatest Elongation.

VII. Given the altitude of the Pole Star, to find the latitude of the place.

VIII. Compute the Longitude, Right Ascension and Declination of the Sun, any one of those quantities and the obliquity of the Ecliptic being given.

IX. Given the meridian altitude and Declination of a heavenly body, to find the latitude of the place.

X. Find the time by a single altitude of the Sun, and deduce therefrom the longitude of the place, by the chronometer.

XI. Deduce the value of the Lunar ecliptic limits, and show when an eclipse of the moon is impossible and when inevitable.

XII. Give Kepler's third law, and show the application thereof to the finding of the Sun's horizontal Parallax, by observing the transit of Venus.

IX. RHETORIC, ORATORY AND GENERAL LITERATURE—PROFESSOR SHACKFORD.

I. ENGLISH COMPOSITION.

FIRST YEAR, FIRST TERM.

1. How can an element of a sentence be expanded? Give an example.

2. What is meant by the Unity of a sentence?

3. What faults of construction detract from Strength of expression?

4. State what Rhetorical principles are violated in the following sentences:

(*a*) "When I attempt to make a nearer acquaintance through the medium of Danish, they are shy and shrinking to such an extent that they do not attempt to conceal it."

(*b*) His dormant affections quickly awakened to fasten themselves pertinaciously around the timely object. His thoughts began industriously to shape out for himself a new future, which should embrace, as a setting, its appropriate jewel, a brilliant and prosperous career for this young hope of his house.

(*c*) What Skimpole wished to appear, La Fontaine was; a self-unconscious humbug, the one; simple and without guise, the latter.

(*d*) She has lectured one hundred nights, traveled several thousand miles, and written a book on Ethics, and all within a year—which is doing well, if she is a woman.

(*e*) I never failed in a solitary case to far exceed the hopes of my class.

(*f*) It is well calculated to develop those rational faculties, which, in the old system, were left to develop themselves.

5. How is Simplicity a relative quality in the choice of words?
6. Construct a Periodic, and change it into a Loose, sentence.
7. Mention some of the ways of varying a sentence.
8. When are *on the contrary, on the other hand, conversely, obversely,* used as links between sentences?
9. Mention some of the methods of building up a paragraph.
10. Consider in detail the following paragraph in regard (*a*) to the construction of the several sentences; (*b*) to the choice of words; (*c*) to its conformity to the rules of the Paragraph:

(1) "The attempt has utterly failed, even when made under the most favorable conditions for success. (2) For instance, the French Academy, containing the great body of the distinguished literary men of France, once sought to exercise such a domination over their own language, and, if any could have succeeded, might have hoped to do so. (3) But the language recked of their decrees, as little as the advancing ocean did of those of Canute. (4) They were obliged to give way, and in each successive edition of their dictionary, to throw open its doors to words which had established themselves in the language, and would hold their ground, comparatively indifferent whether they received their seal of allowance or not."

2. ENGLISH COMPOSITION.

SECOND TERM.

I.

1. From what does Antithesis derive its force?
2. What is necessary to make a resemblance a Figure of Speech?
3. What conditions must be satisfied when a Figure of Similarity is employed to aid the understanding?
4. Exemplify the difference between the Antithesis and the Epigram.
5. State the chief means of attaining Brevity.
6. What principles of Arrangement aid the understanding of a complex statement?
7. What are the conditions in the employment of language to excite Pathetic emotion?
8. Explain what is meant by the permanent, and the variable element in Taste.

II.

9. From what does the Simile derive its force?
10. Mention forms of Antithesis in which the contrast is of a secondary kind.
11. State the nature and object of Fictitious Examples.

12. Explain the nature and effect of Innuendo.
13. How does Variety contribute to Strength?
14. Why do many scenes and works of Art please after frequent repetition?
15. How is the effect of Ludicrous degradation softened?
16. In what ways is language made to produce æsthetic effects?

III.

17. From what does Metonymy derive its force?
18. What conditions are necessary to render Metaphor a source of pleasure?
19. State the nature and limits of the Hyperbole.
20. What is the Identical assertion? Seeming Irrelevance? Extreme case?
21. State the three kinds of violation of Brevity.
22. Mention the conditions essential to Sublimity.
23. What are the elements that enter into Wit?
24. What are the conditions of Melody in the construction of clauses and sentences?

3. HISTORY AND ELEMENTS OF THE ENGLISH LANGUAGE.

FRESHMAN YEAR, THIRD TERM.

1. State briefly the foreign influences that have operated in the growth and development of English.
2. What Scandinavian peculiarities are found in English etymology and syntax?
3. What has brought about the dropping of inflections?
4. Indicate the character of the changes that have taken place since the 14th century.
5. What division into Periods is generally made?
6. What are the terminations of nouns that have come from the French?
7. Whence do we get the words *geology, seraphim, algebra, orrery, reynard, parchment, magnet, imp, snow, second, three, uncle, domestic, stentorian, amen?*
8. Give the reason in each case for calling the following words Anglo-Saxon: *good, go, old, quicken, knock, father, goose, sun, buzz, three, fourth.*
9. Why is an Anglo-Saxon style strong and picturesque?
10. Name some words where the noun is Anglo-Saxon and the adjective of foreign origin.
11. Explain *free-mason, beef-eater, grocer, brand-new, island, shame-faced, Charles' wain, twilight.*
12. What are the two great Landmarks of the Semi-Saxon period?
13. What is the explanation of synonymous words often used in pairs?

14. Explain the following forms: *did, its, mine, here, once, him, whom, whilom, be* and *gain* as prefixes.

15. Give the force of the adjective suffixes, *y, en, ly, ed, ish, ern, ive.*

16. What is the relation between consonants in English and in German?

17. State the three ways of expressing the relation between the parts of a compound, with an example of each way.

18. Trace the origin of several particles.

19. State some of the causes of the anomalies in English orthography.

20. What are the peculiar characteristics of the verb?

21. Give the principal formatives of the verb, and their force.

22. To what can the substantive verb be traced back in all languages? Why called substantive?

23. Explain the auxiliaries *may, can, shall, will, should, would, could, do.*

24. How does a foreign word become naturalized?

25. What principle operates in causing the change commented upon in the following words: "As the pupils grow older, they do not care to read about a fair lady, but they are at once drawn to a female possessing considerable personal attractions. A brawl is a word good enough for a scuffle between peasants; but between aldermen the brawl becomes a fracas. An emeute is a far genteeler word than a riot. A farmer prides himself upon being an agriculturist."

26. Make a list of the Anglo-Saxon words, and of those of French origin in the preceding quotation.

27. Make a list of the symbolic and the presentive words.

28. Indicate the terminations for causative, intensive, frequentative, and inceptive verbs.

29. What are the three kinds of syntax?

30. State the principal heads under which changes in words may be classified, with an example of each class.

4. RHETORIC.

FOURTH YEAR, FIRST TERM.

1. The Division of Arguments.
2. The Sign.
3. Concurrent Testimony.
4. The "Idola" of Bacon.
5. The Progressive argument.
6. Analogy.
7. Inductive and Syllogistic Reasoning.
8. The Burden of Proof.
9. The Rebutting of Presumption.
10. Invented Examples as Argument and as Ornament.

11. Direct and Indirect Refutation.
12. The Use of certain Ambiguous Words, with three examples.
13. The Statement of Objections.
14. The different kinds of Introduction, with examples.
15. The Peroration.
16. The Address to the Feelings, and to the Understanding.
17. Indirect Description.
18. Perspicuity in the Construction of Sentences.
19. Energy as effected by the use of Tropes.
20. The Suggestive Style.

5. ANCIENT ORATORY.

SENIOR YEAR.—SECOND TERM.

1. What was the function of the orator at Athens?
2. What were the divisions of ancient oratory?
3. What limitations in the modern use of the word oratory?
4. Whence are oratorical rules derived?
5. What circumstances gave to Athenian oratory its peculiar development?
6. What are the leading points of difference between that period and our time?
7. What is the connection between oratory and democracy?
8. Give an account of the first political orator at Athens.
9. The character, style, and influence of Georgias.
10. Who were the prominent sophists? What was their relation to Grecian culture?
11. By whom was "The lives of the ten orators" probably written?
12. What were the peculiarities of the style of Lysias?
13. State the peculiar features in the life, character and position of Socrates?
14. Plato's view of Rhetoric in the Georgias, and in the Phædrus.
15. His view of the essential opposition of the philosophical to the political life.
16. What were the characteristics of Demosthenes' style?
17. Who were the leaders of the Macedonian and the Anti-Macedonian party?
18. Compare Demosthenes and Cicero.
19. State what were the characteristics of the decline of eloquence.
20. Name the different periods of Roman eloquence after the Italian period.

6. COMPARATIVE LITERATURE.—FOURTH YEAR.—THIRD TERM.

[*Ten topics assigned to each student.*]

1. In what respect is all criticism comparative?
2. What is "disinterestedness" in criticism?
3. Give a definition of literature.
4. How does Hegel classify the different kinds of poetry?
5. What is meant by Aristotle's aphorism, "Poetry is truer than history?"
6. In what do present methods of literary criticism differ from past?
7. What is Sainte Beuve's idea of a classic writer?
8. Give a concise statement of Romanticism and Classicism in literature.
9. What gives a work a place in Universal literature?
10. Why is the Fable one of the earliest forms of literature?
11. State the characteristic features of La Fontaine, and the points of difference between his fables, those of Æsop, and those of India.
12. How far is poetry an "imitative" art, and what are the limitations to the term?
13. Illustrate, by epic, elegiac and iambic verse the necessity and æsthetic value of rhythmic expression.
14. What is peculiar to Hebrew poetry?
15. State the theories concerning the Homeric epopee.
16. In what does epic unity consist? lyric? dramatic?
17. Mention the great national epics, and the features which they have in common.
18. What is meant by epic "machinery," and how can the term be applied to Homer and Virgil?
19. Give De Quincey's view of an Achilleis.
20. How does the Nibelungenlied illustrate the formation and growth of the national epic?
21. State your idea of Tennyson's Idyls of the King as an epic.
22. Show some of the characteristic differences between the drama of Æschylus, Sophocles, Euripides and Shakespeare.
23. Give a brief account of the "Prometheus," "Antigone," and "Medea."
24. Mention the leading characteristics of the comedy of Aristophanes.
25. State and criticise Taine's estimate of Milton.
26. What was the origin and function of the Greek chorus?
27. When did History first take its place as a distinct form of literature in Greece?
28. What are Aristotle's reasons for assigning to the drama a higher place than to the epopee?
29. State the characteristic features of Roman literature.

30. What is the chief distinction between the French and English drama at the period of highest development, and what is the leading cause of that difference?

X. MILITARY SCIENCE.

TACTICS, FIELD FORTIFICATION, ETC.—LT. VAN NESS.

1. Give the commands and explain how a battalion in column of fours may be rapidly thrown to the front in line of battle.
2. By what commands and movements may a battalion in double column be deployed to the right or left into line of battle?
3. What are the functions of each of the three arms of the service: infantry, cavalry and artillery?
4. Explain the composition and duties of the advance guard of an army in the field.
5. State the object of outposts, and how they are disposed.
6. Draw a plan of a bastioned fort, and describe the mode of constructing such a work of earth.
7. Explain the manner of constructing bomb-proof shelters and powder magazines.
8. Describe the three kinds of cannon now in use, and the projectiles which pertain to each.
9. Describe the time, concussion, and percussion fuzes.
10. Describe the Bormann time-fuze.

III. TECHNICAL COURSES.

The studies of the first two years of each of the Technical Courses are to a large extent the same as those of the first two years in the course in science. Hence, the examination papers that follow relate to studies of the third and fourth years of the respective courses.

I. AGRICULTURE.

[*Besides the papers given below, all those on Botany and Economic entomology in the special department of Natural History are included in the course in Agriculture also.*]

I. AGRICULTURAL CHEMISTRY—PROFESSOR CALDWELL.

I. JUNIOR YEAR—FIRST TERM.

1. What is meant by the terms "specific gravity" and "specific heat?" How are the specific heat and specific gravity of a body determined?
2. Illustrate by examples and explain the absorptive power of solids for gases.

3. Describe and explain the phenomenon of osmose.
4. What relations do heat and electricity bear to chemical change?
5. Name the elements that compose most of the known mass of the earth in the order of the abundance of their occurrence.
6. Five pounds of nitric acid and eight pounds of ammonia may be conveyed to the soil of an acre in the annual rainfall. How much would it cost to supply an equal quantity of nitrogen in the form of ammonic sulphate, containing 90 per cent. of pure salt, and costing six cents per pound?
7. What are the chemical changes that accompany the germination of seeds?
8. What changes in the condition of the surrounding atmosphere are produced by growing plants?
9. What are the relations between fermentation, putrefaction and life?
10. What are the proofs that soil is derived from the rocks?
11. Describe the main features of water-culture experimentation.
12. How would you proceed to investigate the function of an ash ingredient of a plant?
13. In what form must the sulphur required by the plant be supplied in its food?
14. Discuss the occurrence, necessity and function of sodium, with respect to vegetable growth.
15. Describe the principal steps in a quantitative gravimetrical analysis.

II. JUNIOR YEAR—SECOND TERM.

1. Why does a soil rich in humus absorb more oxygen than one poor in humus?
2. What interesting result is produced when a solution of an ammonium salt is passed through a portion of soil, and how can it be proved that the phenomenon is not a case of mere displacement of the solution already in the soil?
3. Explain the chemistry of the action of zoolites as absorbents of plant food.
4. How is it proved that zoolites are present in an arable soil?
5. Is or is not any part of the absorbent power of the soil attributable nearly to its porosity, and upon what experiments do you base your answer?
6. What oxide takes special part in the absorptive power of the soil for phosphoric acid?
7 Are nitrates absorbed by the soil? Give the reason for your answer.
8 If the soil of an acre one foot deep weighs about 3,000,000 pounds, and a fair dressing of guano, containing 10 per cent. of nitrogen, is 300 pounds; what bearing have these facts in illustration of the practical value of a soil analysis?

9. What are the chemical properties of humus?

10. What is the evidence that shows that plants do not get their carbon from the humus of the soil in which they grow?

11. What is the relation between the amount of combined nitrogen conveyed to the soil in the atmospheric precipitations, and the amount required by the crops?

12. How does the agricultural value of a lime yielded by dolomite compare with that yielded by limestone? Give the reason for your answer.

14. What part may lime play in a soil containing much nitrogen in the form of organic remains?

15. Explain the chemistry of the conversion of insoluble into soluble phosphate.

16. About what proportion of its manurial value does fodder lose in its conversion into manure by the animal?

2. VETERINARY MEDICINE AND SURGERY—PROFESSOR LAW.

I. VETERINARY ANATOMY AND PHYSIOLOGY.

1. Describe the shoulder joint in the horse stating particularly the various means by which the bones are retained in apposition.

2. What is the principal thoracic muscle engaged in quiet respiration? State its mode of action and whence it derives its nerves?

3. What muscles coöperate to open the glottis? What is the difference (as regards their origin) of the motor nerves of these muscles on the right side and the left?

4. State what you know of the changes in the air and blood effected in respiration:—of the quantity of air taken in at each inspiration in the horse:—of the amount of deterioration effected by each successive inspiration of the same air;—and the stage at which re-breathed air becomes uninspirable.

5. How would you treat asphyxia in the newborn and adult?

6. What would be the effect of closure of the nostrils in the horse and why?

7. Describe the position and extent of the frontal sinus in the horse and ox.

8. Describe the parotid gland:—its structure, its position, and the course of its duct;—and state the main uses of saliva.

9. Mention what you know of the functions of the liver and the uses of bile.

10. In which of the domestic animals are the intestines the longest and in which the most capacious? What relation does length of intestine bear to the nature of the food and the size of the stomach?

11. State the main differences, in composition and chemical reaction, of the urine of carnivora and herbivora, together with the causes.

12. What causes the sigmoid curve in the penis of the bull? State its pathogenic influence in cases of urinary calculi.

13. Describe the membranes of the fœtus in the later months of gestation, and state the uses of the water bags during pregnancy and parturition.

14. State the leading principles to be considered in seeking to improve animals by breeding.

15. Describe the mode of union of the pedal bone and the hoof wall in the horse.

II. VETERINARY MEDICINE AND SURGERY.

FIRST TERM.

1. What are the general symptoms and phenomena of fever?

2. What special features distinguish cancers from simple tumors?

3. How would you proceed to disinfect a wooden building, containing straw or hay, the building having been occupied by the victims of lung fever?

4. Enumerate the more serious contagious fevers of cattle?

5. In what respects do the malignant carbuncular afflictions differ from the specific contagious fevers? State the general causes and the characteristic lesions in the blood and tissues in the first.

6. State the symptoms and course of the intestinal fever of swine (hog-cholera).

7. Mention the climatic conditions necessary to the maintenance of Texan furr in cattle.

8. Enumerate the common gastric and intestinal parasites of the horse, State the portions of the alimentary canal in which they are respectively found and whether they infest other organs or what.

9. What parasites cause urinous bronchitis in horse, ass, ox, sheep and swine respectively? What are the symptoms of their presence, and the treatment demanded?

10. What different features and habits in the mange producing acari lead to the varying inveteracy of the existing disease?

11. What are the best general parasiticides for parasites living on the skin?

12. What causes tinea tousurans in animals? State the symptoms and treatment.

13. State the causes, symptons and treatment, of goitre in the domestic animals.

14. What conditions give rise to *roaring* in horses?

15. How would you distinguish laryngitis and pharyngitis in the horse?

16. State the distinctive symptoms of *nasal gleet, pus in the nasal sinuses, nasal discharge from diseased teeth, and collections of pus in the guttural pouches.*

III. SECOND TERM.

1. State the common causes of *facial paralysis* in the horse, with the symptoms and treatment.

2. State the symptoms of *amaurosis*, the usual lesions, what cases are curable and what incurable, and the treatment in the different cases.

3. State the symptoms and lesions of *cataract* and what treatment is desirable.

4. A horse has chronic fœtid discharge from the nose, falls off in condition, has occasional slight colicky pains, and drops portions of his food half chewed; what is probably amiss and how can it be remedied?

5. How would you distinguish *inguinal hernia, hydrocele, sarcocele?* What treatment would you advise in each?

6. State the common causes of acute and chronic tympany in oxen, and what can be done to relieve.

7. Give the causes and symptoms of gastric tympany in the horse, and state how it differs in gravity from that of oxen.

8. What functions are fulfilled by the liver in addition to the secretion of bile? What diseased conditions may be brought about by impairment or suspension of these functions?

9. What species of worms is most commonly found in the blood-vessels of the horse? What symptoms arise from their presence in the anterior mesenteric artery and its divisions? What can be done to relieve?

10. State the symptoms of ordinary and capillary bronchitis, and how they can be respectively distinguished from those of worms in the lower air passages, pneumonia and pleurisy? Furnish general principles for treatment.

11. How does the hepatized lung of ox and pig differ from that of the horse or dog?

12. State the general causes and results of periostitis in metacarpal and digital bones, also the treatment in the different stages.

13. Describe the peculiarities of gait characteristic of lameness in shoulder, elbow and foot respectively, and give an explanation founded on anatomical and physiological data.

14. Describe the various conditions causing *knee sprung*, or starting forward at the carpus.

15. Mention the various structural lesions and functional disorders which may cause lameness in the shoulder.

16. Enumerate the disorders which are especially dependent on damp undrained land.

3. APPLIED AGRICULTURE.—PROFESSOR ROBERTS.

I. SENIOR YEAR—FIRST TERM.

1. State how air, water, heat, and light influence the fertility of the soil and the growth of plants.

2. Explain how formed, classify, and give the leading characteristics of soils; also note their adaptation to the growth of grain and grasses.

3. State what climate and soil is best adapted to the growth of cereals.

4. What to clover and the various root crops.

5. How much change in altitude gives a change of one degree in temperature? In this connection give the reason for frost appearing in the lowlands before it does on the adjoining hillsides.

6. State the subjects to be taken into consideration in the selection of a farm placing them in the order of their relative importance.

7. Fields—how laid out.

8. Fences—manner of construction and material used.

9. Plans for construction, and materials for farm buildings.

10. Farm yards and water privileges.

11. Farm house surroundings.

12. Farm accounts—how kept.

13. What are the objects sought by general tillage? How may we best accomplish them?

14. State the benefits arising from the mechanical division of the soil, and explain how we may often accomplish the same result by utilizing the forces of nature.

15. Give in brief the method of the preparation of the soil, planting, harvesting, and marketing of cereals: also, kind, quality, and mode of application of fertilizers.

16. Give in brief the manner of manufacturing, preserving and applying farm yard manure.

17. Give those elements which are most liable to become exhausted from severe cropping.

18. Give the reasons for rotation of crops, and state the amount of Ammonia, Phosphoric acid and Potash that is removed from an acre by a single crop of wheat of twenty five bushels per acre, allowing the straw to weigh three hundred pounds.

II. SENIOR YEAR—SECOND TERM.

1. Give the history and characteristics of Short-horns.

2. Holsteins.

3. Ayrshires.

4. Jerseys.

5. Explain the laws of transmission or likeness.

6. Of variation.

7. State when a prepotent animal is valuable and when not.

8. Draw a circular diagram of the pedigree of the short-horn bull St. Valentine, tracing it through all its branches, and down to the first volume of the English herd-book, and give the per cent. of alloy blood, if any.

9. Give a synopsis of the history of the four leading breeds of swine.

10. State the leading characteristics of each breed and its adaptation to locality and circumstances.

11. Give the reasons why young animals will gain more pounds gross in proportion to the food consumed than old ones.

12. Give the history and comparative value with reference to nearness or remoteness from large cities and cheap lands, of the following breeds of sheep:

13. Spanish Merinos.

14. Southdowns, or Mutton Sheep.

15. Combing, or Long-wooled Sheep.

16. Give the summer and winter management of Sheep and Lambs.

17. Time of shearing, mode of handling, and marketing the wool.

III. SENIOR YEAR—THIRD TERM.

1. What are the injurious effects arising from surplus stagnant water in the soil?

2. Distinguish between moistness and wetness of soils, and illustrate by diagrams.

3. What are the effects produced on soil, climate, and plants by thorough drainage.

4. Explain the Elkington system by diagram and state when it can be advantageously applied.

5. Measure, lay out, and map for thorough drainage, the east field on the farm.

6. Give specifications and estimates for the same, locate silt basins, also give size and kind of tile.

7. Give the method of the preparation of the soil, planting, and cultivation of Indian corn. Explain by diagram and give reasons for the same.

8. Describe the mode of raising roots by both flat and ridge culture, and give their value as food for animals, as compared with English hay.

9. Give in brief the history of the thorough-bred horse.

10. Enumerate and describe the leading breeds of draught horses.

11. Sketch "Goldsmith Maid." Note and number on the margin the exterior points.

12. Compare each of these with the points in the draught horse, and state wherein the mechanical proportion and general conformation may, and should differ.

13. Give the most approved methods of educating and training a young horse.

14. Illustrate with a horse on the campus the manner of subduing those that are vicious and wild.

15. Give stable management for road and farm horses.

16. Give the common and scientific name of each of the various forage plants.

17. Give their comparative value as food for domestic animals.
18. State how and when they should be cut and cured.
19. Collect and name ten species of weeds and state the best methods of eradication.
20. Name the parts in the Reaper and Mower that are most liable to get out of repair.
21. Point out those parts where the greatest loss of power is sustained from concussion, and the remedies for the same.
22. Illustrate by diagram, the principles and attachments of a horse hay fork and conveyor.

4. HORTICULTURE—PROFESSOR PRENTISS.

1. Name the so-called small fruits.
2. Give the botanical name of each, and state the Natural Order to which it belongs.
3. Write out a brief treatise on the cultivation of the small fruit you regard as most valuable.
4. Propose a plan for a fruit garden of two acres which shall admit of the highest degree of economy in its thorough cultivation
5. Give a classification of the diseases of plants.
6. Give a description of those which are most injurious to fruits.
7. Mention the diseases of all our drupaceous fruits, and state the most approved remedies.
8. Give your opinion as to the relationship of forest growth to climate.
9. Define landscape gardening, and name the different styles and schools.
10. Characterize the different styles.

II. ARCHITECTURE—PROFESSOR BABCOCK.

I. EXAMINATION IN BUILDING MATERIALS AND CONSTRUCTION.

1. Name the stones commonly used in building, and classify them geologically.
2. What is lime?
   " " hydraulic lime?
   " " cement?
   " " Portland cement?
   " " plaster Paris?
   " " selenitic mortar?
3. Explain the proper method of making concrete, and give the formula for the ingredients.
4. Name the kinds of wood commonly used in building.
5. Name the different methods of dressing stone.
6. Name and sketch three kinds of facing work in stone walls.

7. Show by sketches the English bond, the Flemish bond, and the common bond.
8. Name the best methods of seasoning timber.
9. What is dry-rot? and how can it be prevented?
10. What metals are commonly used in building?
11. Name and sketch the common forms of arches.
12. Of what is glass made; and what are the ordinary kinds?
13. Define the following terms: Stylobate. Pediment. Battlement. Architrave. Skew-back. Pillar. Pilaster.
14. Name the parts of an entablature.
15. Sketch a king-post truss.
" " queen " "
" " hammer beam truss.
" " collar " "
" " Howe "
16. Name the essential parts of the construction and finish of a wooden stair-case.
17. What materials are used for the outer covering of roofs?
18. Why is sand mixed with the lime in making mortar?
19. What is a compound pier?
20. What metals are bases of the paints in common use?

2. EXAMINATION IN MECHANICS.

1. Define Mechanics; name its subdivisions; and state to which one of them our discussion has been limited.
2. What is a *structure?*
" " " *machine?*
3. What is *force?*
" " *equilibrium?*
4. Define stiffness.
" strength.
" toughness.
5. Define Resolution of forces, and composition of forces, and illustrate by the parallelogram and polygon.
6. What is the *moment* of a body?
7. Sketch a queen-post truss, with braces; name each piece; and state which are ties, and which are struts.
8. State the methods of analyzing a king-post truss graphically.
9. What is the deflection of an oak beam, 20 ft. long, 8x12, carrying a load of 1,000 lbs. at the middle point?
10. Explain the method of finding the centre of gravity of a quadrilateral.
11. Explain the method, and give the formula, for finding the centre of gravity of a figure which is the difference of two figures.
12. What are the four ordinary modes of rupture in an arch?
13. Explain the method of determining the horizontal thrust at the crown of an arch.
14. Explain the method of determining the direction and value of the thrust at the foot of a rafter.

15. How is the position of the neutral axis in a beam determined?
16. What is the ratio of a load at the middle point of a beam to an evenly distributed load which will produce the same deflection?
17. Explain the method of determining the line of resistance in a pier.
18. Explain the method of determining the line of resistance in an arch.
19. To what forces is a loaded beam subjected, and in what part of the beam does each of them act?
20. Explain the principle of the lever, and the method of determining the common centre of gravity of two weights.

3. ARCHITECTURE.

WINTER AND SPRING TERMS.

1. Make a sketch showing the general arrangements of a Christian Basilica, and name the various parts of such a building when fully developed.
2. What is the characteristic feature of the Basilican style? of the Byzantine? of the Lombard? of the Italian Romanesque?
3. Define the following terms: Triforium. Narthex. Campanile. Pendentive. Baptistery. Baldacchino.
4. Name the subdivisions of Romanesque Architecture.
5. Name the two best examples of Byzantine Architecture, and give their dates.
6. Explain the general treatment of the bell of a capital in the Romanesque styles, and sketch the typical forms.
7. What methods of decorating the interior surfaces were in use during the Byzantine period?
8. Name the style to which each of the following buildings belong: The Cathedral at Worms. St. Nicholas, Bari. Santa Fosca, Torcello. Cathedral at Pisa. San Miniato, Florence. San Ambrogio, Milan. Cathedral at Spires. Notre Dame, Clermont. Cathedral at Rheims. Cathedral at Canterbury. St. George, Bocherville. Tower of Earl's Barton.
9. What are the subdivisions of Gothic Architecture?
10. Sketch a plan of a fully developed Rib-Vault, and name the parts.
11. Sketch and name the typical forms of the vaulting used in the later English Gothic buildings.
12. Sketch the sections of the different kinds of Bowtells.
13. Sketch a plan of a Romanesque compound pier, and the arch supported by it.
14. Explain, and show by sketches, the difference between plate-tracery and bar-tracery.
15. Explain and sketch the methods of effecting the transition from the square tower to the octagon spire.

16. For what purpose was the pointed arch first systematically used?
17. Show by a sketch the construction of a sexpartite vault.
18. Give the dates of the three periods of English Gothic Architecture.
19. Why was the flying buttress introduced?
20. Which is the best Gothic Cathedral in France? Which is the best Gothic Cathedral in England? Which is the best Gothic Cathedral in Germany?

III. CHEMISTRY AND PHYSICS.

CHEMISTRY—PROFESSOR CALDWELL.

1. QUALITATIVE ANALYSIS.

SECOND YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used, to prove, both the presence of these elements, and the absence of all others: if possible, write the equations representing the final reactions by which you prove the presence of each of the elements mentioned.

1. As_2O_3, $SnCl_2$, $Pb(C_2H_3O_2)_2$, $Bi(NO_3)_2$, NH_4Cl, KCy.
2. K_4FeCy_6, HNa_2PO_4, $(NH_4)_2C_2O_4$, $Na_2B_4O_7$.
3. $Pb(C_2H_3O_2)_2$, $AgNO_3$, $HgCl_2$, Na_2SO_3, $(NH_4)_2C_2O_4$, Na_2SO_4.
4. $FeSO_4$, FeS, Cr_2O_3, Al_2O_3, $CuSO_4$, Hg_2Cl_2, $SnCl_2$.

2. QUANTITATIVE ANALYSIS.

THIRD YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the quantitative analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used.

1. Cupric sulphate, (the copper being precipitated as hydride).
2. Brass.
3. Rochelle salt (estimation of potassium and sodium).
4. Ferric phosphate.
5. Type metal.

3. CHEMICAL PHILOSOPHY.

THIRD YEAR, FIRST TERM.

1. What weight of Hydrogen is required to raise a weight of

5000 gms., and what would be its volume at —17° C. and 255 mm. barometric pressure.

2. How much iron would be required to produce that amount of Hydrogen. $Fe+H_2SO_4+aq=FeSO_4+aq+H_2$.

3. Define molecule. What is a simple, and what a compound molecule? Give examples.

4. What is meant by atomic and what by molecular weight? Show how the laws of definite and multiple proportion are in accordance with the atomic theory.

5. How may we distinguish between a mixture and a chemical compound?

6. What relation does the molecular weight bear to the sp. gr. of the molecule in the gaseous state?

7. What is the weight in criths of one liter of HCl?

8. The specific heat of a metal is .03244. It forms a compound with Chlorine containing 34.8 per cent. of Cl. What is the atomic weight of the metal and what is its quantivalence?

9. Molecular weight of potassic chlorate is 122.6, and 2.95 grs. contain 1.155 grs. of oxygen. Required the total atomic weight of oxygen, and the number of oxygen atoms in the molecule.

10. Analysis of a substance gives the following results:—C 26.57; H, 2.74; O, 71.11. Required the simplest formula, and the percentage composition calculated from that formula.

11. Explain variations in equivalence. What is the law that governs this variable power? Give examples.

12. What are condensed types? Give examples.

13. What are fat acids? In forming fat acids from alcohols, how are the positive radicals changed to negative ones?

14. Give the general formula for mixed ethers.

15. What is the rule for the termination of the positive radical, in the nomenclature of ternary compounds of the water type?

16. In case of variation of quantivalence in the negative radical. what are the terminations and prefixes used in the nomenclature of ternary compounds of the water type?

17. To what class does the compound represented by each of the following symbols belong:

CH_3	C_2H_5	C_2H_4	C_2O_2	K
H N	C_2H_5 N	H_2 N_2	H_2 N_2	Cl N
H	H	H_2	H_2	H

CHEMICAL TECHNOLOGY—PROF. BRENEMAN.

THIRD YEAR, SECOND TERM.

1. Show the general relations of the direct products of chemical industry to the indirect and waste products.

2. Describe the manufacture of the form of sulphuric acid known as chamber acid and give the characteristic properties of this product.

3. Explain the internal economy of the lead chamber with reference to the chemistry of the process and the probable localization of the different reactions.

4. Describe the Glover's tower, Sprengel jet and Faure and Kessler still used in the manufacture of sulphuric acid.

5. Give an account of the recovery of sulphur from the tank waste of the soda works and compare the different methods in use.

6. Describe the lixciviation of black ash and compare the views of Scheurer, Kestner and Kolb as to the chemistry of this process with those of Dumas.

7. Describe the rotary soda furnace and compare it with the ordinary black ash furnace.

8. Explain the ammonia soda process; give an account of its origin and discuss its commercial importance.

9. Describe in detail the manufacture of bleaching power, giving the conditions to be observed in preparation and packing.

10. Describe the Stassfurt salt deposits and show their relations to the chemical industries.

11. Explain the nature of "rosin," "olein," "mottled" and "silicated" soaps.

12. Describe the by-products of the fat acid industry and their utilization.

13. Give an account of the gas purifier and compare the different methods of purification.

14. Trace the changes in the chemical composition of coal gas from the retort to the gasometer.

IV. CIVIL ENGINEERING—PROFESSOR FUERTES.

[*Each student in this Department on entering the examination room, draws by lot a numbered card containing the subjects he is expected to discuss.*]

I. MECHANICS.

[*Papers which give only the general heading of a subject indicate that the student is expected to write, as fully as he may be able, upon the theory of the subject and also to develop and discuss the mathematical analysis.*]

I.

12. Demonstrate several methods for finding the resultant of a system of forces in space.

16. Centres of gravity.

20. Develop and discuss the formula for dynamical stability.

II.

1. (*a*) Couples. (*b*) Centrifugal force. (*c*) Centre of percussion.

III.

1. Strength of shearing: (*a*) Working load. (*b*) Rupture by shearing.

6. Action of shearing force in the plane of rupture. Value of the shearing force.

11. (*a*) Modulus of proof strength for shearing. (*b*) Power that may develop the shearing stress to the limit of proof strength for elliptical, cylindrical and tubular girders.

IV.

1. Elongation of a prismatic body in terms of the elongating force: Modulus of elasticity. The force corresponding to the elongation.

(*a*) UNIFORMLY LOADED GIRDERS.

I. *Free at one end.*—Find the tangential angle, and the ordinate giving the deflection for any point of the curve. The deflection for the middle point of the girder. The work done in producing the deflection. The deflection for a terminal load in addition to the uniform load.

II. *Girder supported at both ends.*—Find the total deflection. Prove that for a uniform load, the depression is $\frac{5}{8}$ of that produced by a local central load.

$$\text{Data}: Q = ql \qquad \delta_1 = \frac{Ps^2}{n^2 WE}$$

(*b*) HOLLOW AND WEBBED GIRDERS.

Find the measure of the moment of flexure of the following: A tubular girder. A single webbed girder with double flanges. A crucial girder. A T girder. Prove that for the same quantity of material the high webbed and flanged girder gives the greatest moment of flexure. In the case of a beam twice as deep as it is broad, find the moment of flexure when the direction of the force is parallel to the depth of the beam, and compare it with that when the deflecting force is normal to it.

(*c*) MOMENTS OF PROOF LOAD.

Prove that the moment of proof load for parallelopipedical beams increases with the width and the square of the height, while the proof load varies inversely as the length.

Also that in bodies of equal weights, masses or cross-sections, the proof loads are proportions to their heights. And that when a square beam is placed with its diagonal in the plane of the deflecting force, its proof load is 0.707 of what it would be if it were laid on its side.

$$\textit{Data}: Pl = \frac{WT}{E} \qquad W = \frac{bh^2}{12} = \frac{\pi a^2 b}{4} = \frac{\pi r^4}{4} \text{ \&c.}$$

(*d*) GIRDER FIXED AT ONE END AND LOADED BY TWO PARALLEL FORCES.

Find the moments of flexure. Discuss the maxima and minima values of these moments for all positive and negative values of the pressures, and locate the points of inflection of the elastic curve.

$$\text{Data: } r = \frac{WE}{m} = \frac{WE}{Px}$$

No. 6.

Find the most general equation of the elastic curve, or

$$y = \frac{Pl^3}{3WE}$$

$$\text{Data: } r = \frac{WE}{Pa} \qquad r = \frac{(dx^2+dy^2)^{\frac{3}{2}}}{d^2y dx} = \frac{1}{\frac{d^2y}{dx^2}} \text{ nearly.}$$

Take the origin at the loaded end of a beam, fixed at one and free at the other. If you prefer Weisbach's method, take

$$WE = Pxr \qquad ds = \sqrt{1+(\tan a)^2}dx \qquad r = -\frac{ds^3}{dx^2.d(\tan a)}$$

$$\tan a = \frac{P(b^2 - x^2)}{2WE}$$

(*e*) MOMENT OF FLEXURE.

Prove that in rectangular beams, the neutral axis passes, theoretically, through the centre of gravity of the cross-section; and find the bending moment for a parallelopipedical beam, imbedded at one end and loaded at the other. Find also the radius of curvature of the neutral surface.

(*f*) FRICTION.

Find the force required to draw a body up or down upon an inclined plane under any conditions of the direction of the force and of the motion.

(*g*) FRICTION.

Find the moment of friction of a cylinder resting on its right section; also when it rests on a cylindrical ring, and when on a conical pivot.

2. LAND SURVEYING—MR. CRANDALL.

1. Assume the following field notes and magnetic bearings:

* * * * * * * *

The magnetic variation is 7 degrees, 15 minutes West. Reduce the data to the true meridian, calculate the area by latitudes and departures, prepare the plotting sheet, and from the N. W. corner of the field draw two lines that will divide the plot into three equal areas.

3. HIGHER GEODESY—MR. CRANDALL.

1. Give a brief outline of the operations required in a trigonometrical survey.

4. Find the angle and side equations, and the probable error of the side *ce* in the following sketch:

* * * * * * * *

The angles of each triangle were observed separately, with the exception of *dea* and *acb*, which were not observed at all: or the side *ae* was observed in only one direction. The base line is *ad*.

5. Required: The data for locating the boundary line, (which is the 42d parallel of latitude) between New York and Pennsylvania.

6. Describe the method of plotting a chart of small extent by means of the Polyconic Projection tables.

7. Find the length of a degree of latitude in the latitude of Cornell.

4. RAILROAD SURVEYING—MR. CRANDALL.

1. Describe the adjustments of the Dumpy Level.

3. In order to locate a railroad two trial lines were run, giving the following field notes (see sketch):

* * * * * * * *

Find the equivalent straight and level length of each, and the more economical line for a given amount of traffic.

5. Required: the frog distance, middle and side ordinates of a turnout on the outside of a 5° curve for a No. 7 frog: length of switch rail twenty feet.

5. BRIDGE CONSTRUCTION—MR. CRANDALL.

1. Define the term factor of safety and give its usual values for iron railroad bridges.

2. Discuss the Howe truss.

4. In a simple truss (as per sketch) subjected to a uniform rolling load, and taking into account the weight of the truss itself, find: (*a*) the general equation for the horizontal strains under the constant load for any point in either chord. (*b*) The horizontal strains for the same points when the moving load covers only a portion of the truss. (*c*) The greatest horizontal strain. (*d*) Discuss the results.

7. In a triple truss (as per sketch) please find: (*a*) the horizon-

tal strains at panel points of upper and lower chords of trusses No. 1, No. 2, and No. 3. (*b*) The compression in triple truss at points of No. 1, No. 2, and No. 3. (*c*) The tensions at panel points of the simple trusses.

18. State the conditions of a post and tie, under which the inclination for a minimum of material may be obtained, discuss the results of the analysis and solve any example.

6 BAROMETRICAL LEVELING—PROFESSOR FUERTES.

After making a double and simultaneous set of observations, the following data were obtained, after correcting for errors of the instruments:

Barometer columns at lower station	= 29".439
" " " upper "	= 29".200
Attached thermometer at " "	= 72°.08
" " " lower "	= 75°.91
Detached " " " "	= 75°.72
" " " upper "	= 72.33
Latitude	= 16°55′

Cistern on field, 6 feet above cistern at standard station. Elevation of sea level, 700 feet below cistern at standard station.

Find the elevation of the upper station above the sea.

7. ASTRONOMY.—PROFESSOR FUERTES.

1. Describe the sextant, the principle of its construction and its adjustments, including the adjustment for eccentricity.

13. Assume the following data:

Ithaca, N. Y., Dec. 7th, 1874.

Upper and lower limbs of the Sun, measured, in latitude, say, 42° 27ᵐ 30″ N, and longitude 1ᵐ 40ˢ E of Washington. The mean time of observing the Sun's centre was 9ʰ 53ᵐ 51ˢ 725; and the double altitude corresponding to this time was 36° 50ᵐ. The index error and all other sextant errors were +2′ 26″ 25. The chronometer keeps Albany mean time, and on the previous noon had been found 35ˢ 79 slow. Find the rate of the chronometer, remembering that Albany is 11ᵐ 32″ 87 E of Ithaca.

14. Using as much as may be necessary from the above, find the latitude of Cornell, with the following additional data, taken on Dec. 5th, 1874.

Mean of the double altitudes of the Sun's centre, -	43° 27ᵐ 30ˢ
" " a. m. times, - - - - -	10° 29ᵐ 9ˢ 09
Index and other sextant errors, - - - - -	+2ᵐ 12″ 5

8. HYDRAULICS.—PROFESSOR FUERTES.

7. Discuss the theory of efflux in accordance with Prof. Eddy's method.

8. Find the theoretical discharge through circular orifices in a thin plate.

19. Find the expressions for the head, diameter, velocity and delivery of long pipes, for all velocities, taking into account all resistances. Discuss the formulæ, the manner of applying them, and the precautions to be observed in designing a system of distributing pipes.

26. Describe the conditions of efflux when an abrupt contraction takes place in a conduit by the interposition of a diaphragm, find the loss of head and the law of the coefficient of resistance, and also the coefficients of resistance and contraction when the diaphragm is removed.

34. Sketch and describe a single and a double canal lock. Find the time required for filling and emptying both kinds of locks, and establish formulæ for the water consumption under circumstances of traffic that you may assume at your will.

22. In order to judge of the relative merit of several water meters, suppose that they are made to deliver water (under the same conditions of pressure and connections) through a short horizontal mouth-piece under 12 ft. of head. One of these meters is observed to deliver a turbid stream having a horizontal range of 9.8 ft., after falling through a height of 1.67 ft.; but at a vertical distance of 3.27 ft. below the outlet, the horizontal range is 4.9c ft. Required the coefficient of velocity due to the resistances offered by this meter.

37. Find the height of swell produced by a weir when it is and when it is not submerged or drowned.

38. Find the amplitude of backwater caused by a weir.

6. Given the fall, peripheral velocity and angle from the vertical at which an over-shot wheel takes water, find the radius of the wheel, the number of revolutions, width and number of buckets.

11. Find the effect of the impact, of the weight of the water, and of the centrifugal force, in an over-shot wheel.

STEREOTOMY.—PROFESSOR FUERTES.

1. The dimensions of an oblique segmental arch bridge are as follows:

* * * * * * *

Please calculate, by Buck's system, (*a*) the oblique span. (*b*) Obliquity. (*c*) Angle of the soffit. (*d*) Length of heading spiral. (*e*) Number of voussoirs, [about $1\frac{1}{4}$ feet thick] (*d*) Thickness of voussoirs. (*e*) Length of impost. (*f*) Actual divergence of courses. (*g*) Adjusted angle of soffit and axial length. (*h*) Angles of extrados and of twist. (*i*) Adjusted eccentricity. (*j*) Size of parallel rule, distance between winding sticks at intrados and extrados, and breadth of broad end of winding stick. (*k*) Triangular template for skew backs. (*l*) Describe the manner of constructing and using the templates for the six faces of the arch stones.

2. Explain the different systems of construction in oblique bridges, and compare their relative advantages and disadvantages. Sketch the projections for the so called helicoidal, logarithmic and corne de vache arches.

10. CIVIL ENGINEERING.—PROFESSOR FUERTES.

Describe the modes of rupture of several kinds of arches. Find the pressure per units of surface upon the joints of an arch.

5. Establish Van Buren's general equation for calculating the stability of retaining walls. Discuss its applications in a general way.

7. Manipulations of mortars and concrete. Theory of mortars.

9. Classification of tunnels, their dimensions, form, etc. Running the shafts.

11. Driving the headings. Poling boards.

13. Staking out the longitudinal profile underground. Laying out the transverse section of a tunnel.

5. MECHANIC ARTS.

I. LINEAR DRAWING.—PROFESSOR MORRIS.

SECOND YEAR.—FIRST TERM.

1. To divide the line A B into any number of equal parts. Let the number be 7, 9, 13.

2. To construct a square on a given diagonal AB.

3. To inscribe a square in any triangle ABC; in a given trapezium ABCD.

4. On a given line AB construct a regular pentagon; a regular heptagon.

5. To inscribe three equal circles in a given circle.

6. The diameters being given, draw an ellipse by intersecting arcs.

7. To construct a parabola, the base AB and abscissa CD being given.

8. To draw a hyperbola, having given the diameter AB, the abscissa and double ordinate CE.

9. To describe the cycloid, epicycloid, hypocycloid.

10. To draw a circle which shall touch both lines of an angle and shall pass through a given point P.

II. ORTHOGRAPHIC PROJECTION.—PROFESSOR MORRIS.

SECOND YEAR.—SECOND TERM.

1. Give the plan and elevation of a line 2 inches long when it is inclined at 70 degrees to the horizontal and 45 degrees to the vertical plane.

2. Give plan and elevation of a square plane, 3 inches side when one of its diagonals is at 45 degrees to the horizontal and 60 degrees to the vertical plane, the other diagonal being parallel to the horizontal plane.

3. Give plan and elevation of a cube, 2 inches side, when resting on one of its solid angles, one diagonal of the base being at 50 degrees to the horizontal and the other 90 degrees to the vertical plane.

4. Draw the plan and elevation of a cylinder 5 inches long and 2 inches in diameter, when the axis is inclined at 60 degrees to the horizontal and 45 degrees to the vertical plane.

5. A pipe of sheet iron, 2 inches diameter, is to be joined so as to turn an angle of 120 degrees. Show on an elevation the inclination of the line of section, and show on a development the line in which the metal must be cut to form the required parts.

6. A cylinder $2\frac{1}{2}$ inches in diameter and 6 inches long, is penetrated by another $1\frac{1}{2}$ inches in diameter and 5 inches long, their axes being at right angles to each other and intersecting at their centres. Show the mode of obtaining the curves of penetration and the development of the larger cylinder.

III. MECHANISM (WILLIS')—PROFESSOR MORRIS.

THIRD YEAR.—SECOND TERM.

1. Draw diagrams and explain the method of finding the velocity ratio in link-work. Give corollaries.

2. Bevel gearing.—The position of the axes being given and also the ratio of the angular velocities, describe the frustra of the cones; also find the angles at the vertices.

3. Teeth of wheels.—To find the smallest number of teeth or pins that can be employed when the pins have no sensible diameter.

4. Describe the odontograph and the method of using it.

5. To describe the teeth of wheels when their axes are not parallel. Example, bevel wheels.

6. In the communication of motion by sliding contact, directional relation changing, how may a varying velocity ratio be obtained?

7. Communication of motion by link-work. Problem: To determine the motion of a slide when the path of the end of the link travels in a line that does not meet the axis; what is the effect of changing the length of the link or connecting rod?

8. Trains of elementary combinations. Problem: Given the velocity ratio of the extreme axes or pieces of a train, to determine the number of intermediate axes and the proportions of the wheels or number of their teeth.

9. How may parallel motions be obtained?

10. Determinate changes—speed pulleys. Problem: Let there

be a set of six speed-pulleys, in each group of which the diameters of the extremes are thirteen inches and four inches, to find the intermediate diameters.

IV. STEAM-ENGINE.—PROFESSOR MORRIS.

THIRD YEAR.—THIRD TERM.

1. Describe the principal parts and appendages of boilers and furnaces.
2. State the difference between a high and a low pressure steam-engine.
3. Describe the principal parts and appendages of a high pressure steam-engine.
4. The same of a low pressure steam-engine.
5. State what you can of testing of boilers, explosions of boilers, incrustation, and care of boilers.
6. How are steam-engines classed?
7. What do you understand by a horse power?
8. How do you ascertain the nominal horse power of high pressure engines?
9. What effect is produced upon the crank pin of a locomotive by changing the length of the main rod, when the cross-head is at the centre of its travel?
10. Where is the crank pin when the piston is at the centre of its stroke, the main rod being four times the length of the stroke?
11. Describe the link-motion.
12. What do you understand by the terms "lead," "lap?"

V. MATERIALS EMPLOYED IN THE CONSTRUCTION.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

1. Divisions of the subjects.
2. Conversion of ore into cast iron.
3. Manufacture of wrought iron.
4. Steel and its production.
5. Characteristics of cast iron, wrought iron and steel.
6. Describe tempering, annealing, case hardening.
7. Zinc, tin, lead, copper and their most useful alloys.
8. Other materials besides the metals used in construction.
9. Care and preservation of materials.

VI. DESIGNING OF MACHINERY.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

Select from the following subjects; give complete and detail *drawings*, with specifications and probable cost.

1. Lathe.—Screw feed. Slide rest, back-geared; swing, 16 inch: bed, 9 ft.
2. Planing Machine.—To plane 22 inches wide, 20 inches high, cross and angular feed.
3. Crank planer with adjustable stroke from 16 inches down; planing 15 inches wide, 13 inches high.
4. Back-geared drill with self-feeding attachment. Traverse of table, 26 inches; of spindle, 12 inches; distance between table and spindle 34 inches; distance between base and spindle 44 inches.
5. Ten H. P. portable engine best suited to agricultural work.

VI. NATURAL HISTORY.

I. BOTANY.

I. SYSTEMATIC AND APPLIED BOTANY.—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—FIRST TERM.

1. Name the five principal groups into which plants are arranged in the natural system of classification.
2. State briefly the distinguishing characteristic of each of these groups.
3. What are plant characters?
4. From what parts of plants are characters of the highest importance derived?
5. Define species, genus, and order.
6. Name ten natural orders which can be easily distinguished by brief characters and state what these characters are.
7. Give a schedule of some species of Rosaceæ proper.
8. On what principle and by whom was the present arrangement of natural orders first adopted?
9. Why is it impossible to express the affinities of the natural orders in a linear arrangement?
10. Mention such indigenous Saxifragaceæ as you know to abound in the flora of Ithaca.
11. Name the cultivated Saxifragaceæ.
12. Name the six largest natural orders in regard to the number of species.
13. Give an account of the distribution of the species of the orders Magnoliaceæ, Leguminosæ, Compositæ and Gramineæ.
14. What are the six most important orders as furnishing food plants in temperate regions?
15. What six orders furnish the most important timber plants?
16. Name the orders which furnish the most extensively used medicines.
17. Name the four plants which furnish very extensively used beverages in different parts of the world, state the order to which each belongs, and give some account of its natural history.

18. The same of the four important sugar-producing plants.

19. Enumerate the products of Euphorbiaceæ, Urticaceæ, Solonaceæ, Chenopodiaceæ, Cruciferæ and Coniferæ, giving as far as possible the scientific names of the most important plants.

20. What orders form the natural group called Amentaceæ?

21. Characterize the sub-orders of Rosaceæ, Leguminosæ, and Compositæ.

22. How do Cyperaceæ differ from Gramineæ?

23. Into what groups can Gramineæ be conveniently arranged for purposes of study?

24. State what the following vegetable products are, and name the plants which produce them: camphor, ginger, alkanest, elaterium, aloes, gum arabic, manna, caoutchouc, gum lac, cinnamon, cloves, nutmeg, turpentine, opium, logwood, rattan, boxwood, asafœtida, croton oil, fustic, jute, saffron, tonka bean, jujube, vanilla.

25. Give some statistics of species, genera, and orders, and of indigenous and introduced plants.

II. VEGETABLE PHYSIOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Describe the vegetable cell and treat of its structure, different forms and physical properties.

2. Give a classification of the different contents of cells and name those of each class.

3. Define and describe the different kinds of plant tissue.

4. Name the fundamental plant organs.

5. What are homologous organs?

6. What is absorption? Give an account of the result of the latest researches concerning this function of plants.

7. What is transpiration? Show how the existence of this function may be demonstrated and the amount of transpiration measured.

8. Treat of plant respiration.

9. Give some account of circulation in plants, and of crude and elaborated sap.

10. Describe the process of assimilation, and name the conditions under which it takes place.

11. Give a classified table of the products of assimilation.

12. Write out an account of starch, describing its formation, structure, variation, and use in the economy of the plant.

13. Name the four elements of the organic constituents of plants, and explain their source in nature.

14. Treat of plant food.

15. How do fertile differ from poor soils in relation to plant growth?

16. Give diagrams of cross sections of exogenous, endogenous and cryptogamous stems, the first in full detail of structure.

17. Describe the medullary system of the exogenous stem in reference to the grain of cabinet and finishing woods.
18. What are the organs of fructification in the phænogamia?
19. Show that a flower is homologous with a branch.
20. Describe the process of fertilization in the phænogams.
21. What is the present state of knowledge in regard to the sexuality of cryptogams?
22. Describe the process of fertilization in Filices.
23. How do seeds differ from spores?
24. Describe briefly the methods instituted by nature for the distribution of the species of plants.

III. FUNGOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Draw a diagram of Æcidium Claytoniatum, and explain its structure.
2. State the specific differences of Æ. Claytoniatum and Æ. berberidis.
3. Explain the structure and supposed office of spermogonia.
4. What is meant by di-morphism?
5. Give an illustration from the false species Uredo rosæ.
6. What effect have parasitic fungi on the plant which nourishes them?
7. What is meant by alternate generation?
8. Illustrate this by a description of the change of forms in Uromyces appendiculatus.
9. Explain the structure of the conidia of Cystopus candidus.
10. Also the zoöspores of the same plant.
11. How is the parasitic fungus of any given crop transmitted to the succeeding crop?
12. Give the result of Doctor de Bary's experiment with the zoöspores of C. candidus.
13. Under what name is the immature wheat rust known?
14. What advantage to parasitic fungi is the production of different forms of fruit?
15. What remedies are available for rust in wheat?
16. Give a description of corn smut.
17. Also of the disease known as bunt.
18. Give some account of the potato rot fungus.
19. Also of the mildew of the grape vine.
20. What remedy is applicable to the latter disease?
21. What is the vinegar plant?
22. How do fungi induce fermentation?
23. What is known of the fungus which causes the disease called yellows?
24. Describe the fungus which causes the black-knot of plum and cherry.

25. How do fungi produce the decay in timber called dry-rot ?
26. How may the attack of this fungus be prevented ?
27. Draw a vertical section of Agaricus campestris, and name the parts.
28. How are edible distinguished from poisonous fungi ?
29. State the characteristics of the six families of fungi.
30. Give a brief general description of fungi, as to their size, form and color.
31. Compare fungi with phænogamia as to their nutrition.
32. What are the uses of fungi ?
33. Mention the diseases caused by fungi, in which prevention or remedy is practicable.
34. Also those in which no available remedy is known.
35. Mention the species of fungi which produce secondary forms of fruit on which false species have been founded.

2. ZOOLOGY.

I. ECONOMIC ENTOMOLOGY—INSTRUCTOR COMSTOCK.

1. Describe the articulate plan of structure.
2. Characterize the class *Insecta.*
3. Give tabular arrangement of the orders and suborders of the class *Insecta.*
4. Characterize the order *Hexapoda.*
5. Characterize the suborder *Lepidoptera.*
6. Explain the terms, larva, pupa, chrysalis, imago, incomplete metamorphoses and complete metamorphoses.
7. Give tabular arrangement of the typical mouth-parts of a true insect (*Hexapoda*).
8. What hymenopterous insects are social, and how do they differ from closely allied solitary forms ?
9. Name two families of the *Hymenoptera* that are parasitic. Describe briefly their habits.
10. Characterize and give the habits of the *Sphingidae* ; also *Aegeriadae.*
11. Describe the habits of the coddling-moth. Name remedies.
12. Describe the metamorphoses of the mosquitoes.
13. Describe the habits of the ground-beetles (*carabidae*), May-beetles (*Lachinosterna*), *Saperda Bivittata*, plant-lice, the snowy tree-cricket, ant-lion, aphis-lion and caddis-worms.

II. COMPARATIVE ANATOMY—PROFESSOR WILDER.

[*This is a special course for the students in the Natural History course and for others who choose to take it. It extends through the second and third terms. The subjects vary from year to year, the purpose being to give a complete account of a few forms or groups of animals, with discussion of their relative and bibliographical references*].

1. Enumerate the fishes of Cayuga lake.
2. Contrast the external and internal structure of the lamprey (*Petromyzon*), and the eel (*Anguilla*.)
3. Describe the development of *Petromyzon*.
4. Give diagrams (as transverse and longitudinal views) of the respiratory apparatus of *Amphioxus*, *Myxine*, *Bellostoma* and *Petromyzon*.
5. Give the external and internal characters of *Amia*, and name the teleostean genera to which it has some resemblance.
6. Compare the gar-pike (*Lepidostens*) with the sturgeon (*Accipenser*.)
7. Describe the brain of *Menobranchus*, and compare it with the brains of other Batrachians.

3. GEOLOGY.

I. ECONOMIC GEOLOGY—PROFESSOR COMSTOCK.

[*Select two questions from each set, except as noted.*]

1. Give series, class, division, family and sub-family of *syenite*, *syenitic granite*, *felstone*, *basalt*, *rhyolite*, *elvanite*, *quartz-porphyry*, *quartzite*, *dolomite*, *diorite* and *flint*.
2. Uses of term *trappean*. Differences of *granitic*, *trappean* and *volcanic* rocks.
3. Name and describe two aqueous, two igneous, and two metamorphic rocks.
4. Concise account of modes of origin of igneous, aqueous and metamorphic rocks.

5. Draw a single section illustrating *conformability*, *unconformability*, *three kinds of ridges* and *six forms of valleys*.
6. Illustrate five kinds of faults. Define "throw" of fault.
7. Illustrate by sections two advantages and two disadvantages in coal mining due to the occurrence of faults.
8. Give the so-called "rules of V."

9. Name the *native* metals in order of abundance and give the modes of occurrence of each in the pure state.
10. Geographical and geological distribution of gold.
11. Geological range of silver and its ores.
12. Give one prominent locality, with geological position, of each of the ores *cryolite*, *magnetite*, *hæmatite*, *galena*.
13. Occurrence of ores of *zinc*, *tin* and *lead*.

14. Occurrence of *copper* and its ores. Sources of mercury. *Chromic iron* in the United States.
15. Geological range of *peat*, *lignite*, *anthracite* and *bituminous coal*.
16. Name and define the principal coal fields of the world, stating character of product from each.

17. Prominent features of *cannel, free burning* and *caking* coal. Give locations of United States coal basins *not* of Carboniferous age.

18. Mode of occurrence and geological relations of *petroleum.*
19. Outline principal United States coal basins of Carboniferous age.
20. Causes of failure to obtain oil from wells sunk into the oil-bearing formation.
21. Most productive region in United States for gas wells. Source of the gas.

[*Here follow a number of sets relating to dyes, pigments, fictile materials, refractory substances, medicines, mineral waters, etc., after which are placed those given below.*]

[*Students of the courses in* SCIENCE *and* NATURAL HISTORY *will select two from this set.*]
46. Why should wells in drift deposits be avoided? Give structures suitable for artesian wells.
47. State clearly the general character of the products of economic importance which appertain to any one geological age.
48. Review briefly the economic products of any State of the Union.

[*Students of the* ENGINEERING COURSE *select two from this set.*]
49. Difference between *lake-formed* and *river-formed* sand-bars.
50. Explain use of *jetties* at river-mouths and elsewhere.
51. Compare *granites, felstones* and *greenstones* as road material. What should be avoided in choice of road gravels?
52. Quarrying in stratified and unstratified rocks, how differing? Placer mining, when practicable?

[*Two from this set to be chosen by students of the* COURSE IN ARCHITECTURE.]
53. Give geological age of the several rocks used in the University buildings. Where is each best developed in the United States, and what are the common defects for building purposes?
54. Relative architectural value of different species of granite.
55. Why is red sandstone often more durable than many kinds containing less iron?
56. Review the geological history and distribution of *marbles.*

II. GEOGNOSY AND PALÆONTOLOGY—PROFESSOR COMSTOCK AND MR. SIMONDS.

[*This list covers in a very general manner the course of work* *performed by under-graduates, some portion of which is required each term of all students in the laboratory.*]

1. Classify as far as *genera*, the rocks and fossils placed before you. (Not less than forty specimens of each, without arrangement, and with labels concealed.)

2. Give the mineral ingredients of five rocks (selected by the examiner) and state all you can justly infer as to their genesis and subsequent history.

3. Illustrate by specimens (chosen by the student from the University collections) the differences in *granitic, trappean* and *volcanic* rocks.

4. Write an essay on the geognosy of the Chemung formation in the vicinity of Ithaca, based upon your own field notes.

5. Model in clay or wax a given local area, showing clearly the geological structure upon which the topography depends.

6. Point out the principal parts of one representative of each *Class* of fossils in your tray. (Specimens selected by the student from a number furnished by the examiner.)

7. Describe the fossil given you, after drawing it carefully, and show its biological and stratigraphical relations.

8. Write an essay on the life of the Hamilton Epoch, based upon your own field notes.

9. Collect the fossils from a given local block (say from a cubic yard of the Chemung formation) and prepare a report upon your observations in the field and laboratory.

III. PALÆONTOLOGY—INSTRUCTOR SIMONDS.

1. Give diagram, name and describe the different parts of a Trilobite.

2. Of what formations are the following species characteristic: *Lychas Boltoni, Phacops bufo, Dalmanites limulurus?*

3. Name the different families of *Brachiopoda*. (The student to select from a number of specimens representatives of each family.)

4. Name and describe the characteristic *Brachiopoda* of the Hamilton Group.

5. Tell all you know of the *Strophomenidæ*.

DEGREES AND PRIZES.

FOR 1876–7.

NINTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 21, 1877.

The Lord's Prayer.

1. ORATION: Assumptions in Political Science,
CHARLES MARION COOPER, *Indianapolis, Ind.*
2. * THESIS IN MECHANIC ARTS: Style in Engineering Construction, WILLARD EUGENE LAPE, *Troy*
3. * THESIS IN SCIENCE: The Criminal and the State,
MARGARETTA JANE SINTON, *Ithaca*
4. * THESIS IN CIVIL ENGINEERING: Investigation of the Different Theories of Leveling,
WALTER JUSTIN SHERMAN, *Norwalk, O.*
5. LITERARY ESSAY: Heinrich Heine,
JACOB AUGUSTUS LOOS, *Philadelphia, Pa.*
6. ESSAY IN AGRICULTURE: Forests, and their Climatic Influence, CHARLES MELVILLE BEAN, *McGrawville*
7. * THESIS IN CIVIL ENGINEERING: Jetties at the South Pass of the Mississippi,
WILLIAM BRYANT THROOP, *Hamilton*
8. * THESIS IN MATHEMATICS: The Line at Infinity,
EDWARD HERENDEN PARMER, *Rochester*
9. * THESIS IN ZOOLOGY: The Cayuga Lake Cottoid,
SIMON HENRY GAGE, *Worcester*
10. ORATION: The Genius of Thomas Carlyle,
WILLARD GENTLEMAN, *Ottawa, Ill.*
11. ORATION: Historical Continuity,
WILLIAM EDWARD LUCAS, *Groves, Ind.*
12. * THESIS IN ARCHITECTURE: Brunelleschi's Dome,
HOWLAND RUSSEL, *Ithaca*
13. * THESIS IN CIVIL ENGINEERING: Milwaukee Water-Works, LOUIS MORRIS MANN, *Milwaukee, Wis.*
14. * THESIS IN BOTANY; Some Forms of Saprolegnieæ,
FRANK BROOKS HINE, *Edon, O.*

* Not read.

ESSAY IN ARCHITECTURE: Ecclesiastical Gothic Architecture,
ARTHUR LUDWIG KARL VOLKMAN, *New York City*

ORATION: "The Sun never sets,"
IDA BRUCE, *New York City*

* THESIS IN CIVIL ENGINEERING: Investigations of the Theory of Least Squares as applicable to Modern Geodesy, DAVID JOSEPH MACPHERSON, *Bay City, Mich.*

* THESIS IN MECHANIC ARTS: Some Developments in Steel Processes and Steel Philosophy,
JOHN SAYLER COON, *Burdett*

WOODFORD ORATION. The Funeral Orations of Brutus and Antony in Shakespeare,
GEORGE WASHINGTON GILLETT, *Villanova*

Presentation of Prizes.

nferring of Degrees and Certificates by the Acting President.

BENEDICTION.

DEGREES CONFERRED IN 1877

'he following is a list of those who received degrees at the ual Commencement at the close of the ninth academic year, ether with the degrees conferred and the residence of each reent:—

FIRST DEGREES.

BACHELORS OF ARTS, (5).

BRUCE,	New York City.
NRY WARD FOSTER,	Ithaca.
JAMIN HERSHEY GROVE,	Buffalo.
MA JANE SELLEW,	Dunkirk.
RTHA CAREY THOMAS,	Baltimore, Md.

BACHELORS OF LITERATURE, (2).

LLIAM RICHARD DOBBYN,	Shetland, Canada.
ITH MAY VAN DUSEN,	Geneva.

BACHELORS OF PHILOSOPHY, (8).

RY DANIEL CLARK,	Forrestville.
ORGE WASHINGTON GILLETT.	Villanova.
LLIAM EDWARD LUCAS,	Groves, Ind.
ERETT O'NEILL,	Savannah.
ANK PATRICK,	New Philadelphia, O.
MUEL MCKEE SMITH,	Winfield.

* *Not read.*

JOHN CHILES HOUSTON STEVENSON,	St. Louis, Mo.
CHARLES FORSYTH WILSON,	Ithaca.

BACHELORS OF SCIENCE, (21).

JENNY BELL BEATY,	Salem.
ANNIS SMITH CARMAN,	Ithaca.
CHARLES SIMEON COBB,	Andover.
CHARLES MARION COOPER,	Indianapolis, Ind.
FRANK DWIGHT CRIM,	Mohawk.
WALDO EMERSON DENNIS,	Amanda, O.
WILLARD GENTLEMAN,	Ottawa, Ill.
WILLIAM STEWART GIFFORD,	Jamestown.
MERRITT ELVIN HAVILAND,	Glen's Falls.
LELAND OSSIAN HOWARD,	Ithaca.
AUGUSTUS JACOB LOOS,	Philadelphia, Pa.
CHARLES BAKER MANDEVILLE,	Elida, Ill.
JAMES STANLEY MILFORD,	New York City.
IRA HENRY MYERS,	Nunda Station.
EDWARD HERENDEN PALMER,	Rochester.
FERDINAND VAN DERVEER SANFORD,	Warwick.
ELROY DELOS SHERMAN,	Cleveland, O.
MARGARETTA JANE SINTON,	Ithaca.
HECTOR HILGARD TYNDALE,	Springfield, Ill.
DE FOREST VAN VLEET,	Candor.
HAMILTON SALISBURY WHITE,	Syracuse.

IN NATURAL HISTORY, (B. S.) (3).

SIMON HENRY GAGE,	Worcester.
FRANK BROOKS HINE,	Edon, O.
FRANK PETERS WEEKS,	Pittsburgh, Pa.

BACHELORS OF AGRICULTURE, (2).

CHARLES MELVILLE BEAN,	McGrawville.
FREDERICK MOSES PENNOCK,	Ithaca.

BACHELORS OF ARCHITECTURE, (7).

ALBERT FRANK BALCH,	St. Johnsbury, Vt.
WILLIAM LLOYD DEMING,	Salem, O.
DAVID WOODBURY KING,	Chateaugay Lake.
CHARLES TOWN MOULD,	Utica.
THEODORE BARNARD PECK,	Bristol, Ct.
HOWLAND RUSSELL, A.B.,	Ithaca.
ARTHUR LUDWIG KARL VOLKMAN,	New York City.

BACHELORS OF CIVIL ENGINEERING, (15).

.IS CHESTER AMES,	Whitney's Point.
AYLEN,	Aylmer, Can.
.IAM ELY BRAMHALL,	Jersey City, N. J.
)NIO EPAMINONDAS DE MARIE FROTA,	Ceará, Brazil.
D JOSEPH MACPHERSON,	Bay City, Mich.
S MORRIS MANN,	Milwaukee, Wis.
DORE LUQUEER MEAD,	New York City.
NGOS CORREA DE MORAES,	S. Paulo, Brazil.
NELSON OSTROM,	East Randolph.
TER JUSTIN SHERMAN,	Norwalk, O.
NE RAYMOND SMITH,	Islip.
ARD THOMAS,	Stowe, Vt.
IAM BRYANT THROOP,	Hamilton.
SON SEBRY TIBBETS,	Belfast.
IM VIEGAS-MUNIS,	Piracicaba, Brazil.

BACHELORS OF MECHANICAL ENGINEERING, (7).

SAYLER COON,	Burdett.
OLD EIDLITZ,	New York City.
ARD EUGENE LAPE,	Troy.
BUSH MCNAIRY,	Cleveland, O.
KLIN OUTERBRIDGE,	Bermuda, W. I.
N EUGENE WARE,	Wrentham, Mass.
SAYLES WATERMAN,	Cumberland Hill, R. I.

SECOND DEGREES.

MASTERS OF ARTS, (2).

NE FRAYER, A.B.,	Cornell.
DORE STANTON, A.B.,	Cornell.

DOCTOR OF PHILOSOPHY, (1).

LES W. FOOTE, M.A.,	Cornell.

MASTERS OF SCIENCE, (3).

EY R. HORTON, B.S.,	Cornell.
P H. PERKINS, B.C.E.,	Cornell.
LES H. WILLMARTH, Agr.B.,	Cornell.

CIVIL ENGINEERS, (2).

S FALKENEAU, B.C.E.,	Cornell.
EN B. FOSTER, B.C.E.,	Cornell.

John Chiles Houston Stevenson,	St. Louis, Mo.
Charles Forsyth Wilson,	Ithaca.

BACHELORS OF SCIENCE, (21).

Jenny Bell Beaty,	Salem.
Annis Smith Carman,	Ithaca.
Charles Simeon Cobb,	Andover.
Charles Marion Cooper,	Indianapolis, Ind.
Frank Dwight Crim,	Mohawk.
Waldo Emerson Dennis,	Amanda, O.
Willard Gentleman,	Ottawa, Ill.
William Stewart Gifford,	Jamestown.
Merritt Elvin Haviland,	Glen's Falls.
Leland Ossian Howard,	Ithaca.
Augustus Jacob Loos,	Philadelphia, Pa.
Charles Baker Mandeville,	Elida, Ill.
James Stanley Milford,	New York City.
Ira Henry Myers,	Nunda Station.
Edward Herenden Palmer,	Rochester.
Ferdinand Van Derveer Sanford,	Warwick.
Elroy Delos Sherman,	Cleveland, O.
Margaretta Jane Sinton,	Ithaca.
Hector Hilgard Tyndale,	Springfield, Ill.
De Forest Van Vleet,	Candor.
Hamilton Salisbury White,	Syracuse.

IN NATURAL HISTORY, (B. S.) (3).

Simon Henry Gage,	Worcester.
Frank Brooks Hine,	Edon, O.
Frank Peters Weeks,	Pittsburgh, Pa.

BACHELORS OF AGRICULTURE, (2).

Charles Melville Bean,	McGrawville.
Frederick Moses Pennock,	Ithaca.

BACHELORS OF ARCHITECTURE, (7).

Albert Frank Balch,	St. Johnsbury, Vt.
William Lloyd Deming,	Salem, O.
David Woodbury King,	Chateaugay Lake.
Charles Town Mould,	Utica.
Theodore Barnard Peck,	Bristol, Ct.
Howland Russell, A.B.,	Ithaca.
Arthur Ludwig Karl Volkman,	New York City.

BACHELORS OF CIVIL ENGINEERING, (15).

WILLIS CHESTER AMES,	Whitney's Point.
JOHN AYLEN,	Aylmer, Can.
WILLIAM ELY BRAMHALL,	Jersey City, N. J.
ANTONIO EPAMINONDAS DE MARIE FROTA,	Cearà, Brazil.
DAVID JOSEPH MACPHERSON,	Bay City, Mich.
LOUIS MORRIS MANN,	Milwaukee, Wis.
THEODORE LUQUEER MEAD,	New York City.
DOMINGOS CORREA DE MORAES,	S. Paulo, Brazil.
JOHN NELSON OSTROM,	East Randolph.
WALTER JUSTIN SHERMAN,	Norwalk, O.
EUGENE RAYMOND SMITH,	Islip.
HOWARD THOMAS,	Stowe, Vt.
WILLIAM BRYANT THROOP,	Hamilton.
ADDISON SEBRY TIBBETS,	Belfast.
JOAQUIM VIEGAS-MUNIS,	Piracicaba, Brazil.

BACHELORS OF MECHANICAL ENGINEERING, (7).

JOHN SAYLER COON,	Burdett.
LEOPOLD EIDLITZ,	New York City.
WILLARD EUGENE LAPE,	Troy.
AMOS BUSH MCNAIRY,	Cleveland, O.
FRANKLIN OUTERBRIDGE,	Bermuda, W. I.
LYMAN EUGENE WARE,	Wrentham, Mass.
JOHN SAYLES WATERMAN,	Cumberland Hill, R. I.

SECOND DEGREES.

MASTERS OF ARTS, (2).

EUGENE FRAYER, A.B.,	Cornell.
THEODORE STANTON, A.B.,	Cornell.

DOCTOR OF PHILOSOPHY, (1).

CHARLES W. FOOTE, M.A.,	Cornell.

MASTERS OF SCIENCE, (3).

DUDLEY R. HORTON, B.S.,	Cornell.
PHILIP H. PERKINS, B.C.E.,	Cornell.
CHARLES H. WILLMARTH, Agr.B.,	Cornell.

CIVIL ENGINEERS, (2).

LOUIS FALKENEAU, B.C.E.,	Cornell.
REUBEN B. FOSTER, B.C.E.,	Cornell.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the ninth academic year—1876–7:—

1. Woodford Prize—a gold medal—Geo. W. Gillett.
2. First Horace K. White prize in Veterinary Science, twenty dollars, Arthur E. Beardsley.
3. Second Horace K. White prize in Veterinary Science, ten dollars, Charles M. Bean.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1877–8.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Individual Manhood as an Influence in History.
2. The Trust in Ideas.
3. The Moral Tendencies fostered by Science.
4. The Poetic Genius of Aeschylus and Milton.
5. Milton's Satan and Goethe's Mephistopheles.
6. The Imagination in Moral and Historical Judgment.
7. The Characteristic Features of an Age of Transition.
8. The Modernness of Ancient Athenian Life.
9. The Immortality of Art.
10. Kingship in Shakespeare's Kings.
11. A Farmer and a Man on the Farm.
12. The Modern Epic—not "Arms and the Man," but "Tools and the Man."

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two *standing* committees, an executive com mittee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of *New York*, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1877-8.

President—L. H. BARNUM, '71.
Vice-Presidents—O. F. WILLIAMS, '69; A. A. ANDREWS, '70; S. F. HUNTLEY, '71; D. M. PAGE, '72; H. ALTMAN, '73; E. O. RANDALL, '74; V. L. DAVEY, '75; C. H. ESTY, '76.
Recording Secretary and Treasurer—G. W. HARRIS.
Corresponding Secretary—S. SMITH.
Executive Committee—J. H. COMSTOCK; H. NORTHRUP; C. L. SMITH; S. SMITH; G. W. HARRIS.
Auditing Committee—W. D. L. WILSON; J. G. MOORE; C. B COON.
Orator—J. F. CLUCK.
Alternate—J. FRANKENHEIMER.
Poet—C. F. ALLEN.
Alternate—A. N. FITCH.

TRUSTEE ELECTED.

STEWART L. WOODFORD.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph. D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B.
C. J. Powers, B. S,
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. (A.M.,'76).
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E.Copeland, Ph.B.,(M.S., '75).
C. L. Crandall,(C.E.,'76).
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73).
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E.,'74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
*H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, (D.V.M.,'76).
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
*C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74)

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S. (C.E.,'76).
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
*E.T.Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell. B. S.
L. Falkeneau, B.C.E. (C.E.,'77).
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
*K. Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
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F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
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R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. (A.M.,'76).
D. W. Bowman, B. C. E.
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F. C. Wood, B. S.

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Hiscock, A. B.
Horton, B. S.
Iutton, Arch. B.
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King, Arch. B.
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Ladd, A. B.
Makepeace, B, C. E.
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Perkins, B. C. E.
Preston, B. C. E.
Preston, B. S.
Roberts, Ph. B.
Rossiter, Arch. B.
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Shaw, B. S.
Simonds, B. S. (M. S., '76).
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Stevens, B. S.
Sturges, Agr. B.
tnall, B. C. E.
'homas, A. B. (A. M., '76).
Thompson, B. S,
Thompson, B. S.
Tomkins, Ph. B.
Walsh, B. S.
Wheeler, B. S.
rthington, A. B.

ADUATED IN 1876. [65]

Ashley, B. S.
Aylen, B. C. E.
·clay, B. S.
P. de Barros, B. C. E.
Berry, A. B.
ardman, B. M. E.
Brewer, Ph. B.
Brown, B. M. E.
A. V. Bueno, B. C. E.
Cady, Arch. B.
Carpenter, B. M. E.
Church, B. M. E.
Conable, B. C. E.
C. B. Coon, B. S.
S. H. Coon, A. B.
E. L. Crandall, B. S.
S. S. Eddy, B. S.
*A. F. Eidlitz, B. C. E.
C. H. Esty, A. B.
W. F. Farmer, B. C. E.
D. F. Flannery, B. S.
C. W. Foote, A. B., M. A., (Ph. D, '77.)
A. W. Foster, A. B., M. A.
E. Frayer, A. B. (A. M., '77).
M. M. Garver, B. S.
H. McC. Hadley, Arch. B.
F. E. Heath, B. S.
A. Z. Kent, B. M. E.
W. H. Kent, B. S.
F. Looney, B. S.
A. E. Maltby, B. C. E.
W. G. McDowell, A. B
J. C. McMullen, B. C.
R. L. Moore, B. S.
F. W. Noyes, Ph. B.
L. B. Palmer, B. S.
W. H. Parker, Arch. B.
C. R. Parkhurst, B. S.
J. Parmelee, B. S.
C. W. Raymond, B. C. E.
H. J. Rice, B. S.
W. K. Roy. B. S.
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H. Russel, A. B.
C. F. Saunders, Arch. B.
H. B. Seeley, Arch. B.
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W. P. Sturges, B. S.
J. B. Tarleton, Arch. B.
F. E. Taylor, B. M. E.
H. Terry, B. S.
E. D. Thompson, B. C. E.
H. C. Tilden, Lit. B.
C. A. Van Velzer, B. S.
E. A. Wagner, B. S.
C. E. Washburne, Ph. B.
C. B. Wheelock, B. C. E.

C. H. Willmarth, Agr. B. (M. S., '77).
C. P. Woodruff, B. S.
R. Yatabe, B. S.
F. O. Young, B. S.

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W. C. Ames, B. C. E.
J. Aylen, B. C. E.
A. F. Balch, Arch. B.
C. M. Bean, Agr. B.
J. B. Beatty, B. S.
W. E. Bramhall, B. C. E.
Ida Bruce, A. B.
A. S. Carman, B. S.
P. D. Clark, Ph. B.
C. S. Cobb, B. S.
C. M. Cooper, B. S.
J. S. Coon, B. M. E.
F. D. Crim, B. S.
W. L. Deming, Arch. B.
W. E. Dennis, B. S.
W. R. Dobbyn, Lit. B.
L. Eidlitz, B. M. E.
H. W. Foster, A. B.
A. E. Frota, B. C. E.
S. H. Gage, B. S.
W. Gentleman, B. S.
W. S. Gifford, B. S.
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B. H. Grove, A. B.
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L. O. Howard, B. S.
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W. E. Lape, B. M. E.
A. J. Loos, B. S.
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D. J. Macpherson, B. C. E.
C. B. Mandeville, B. S.
L. M. Mann, B. C. E.
A. B. McNairy, B. M. E.
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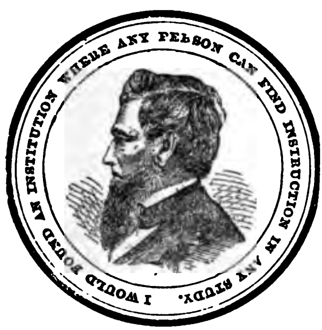

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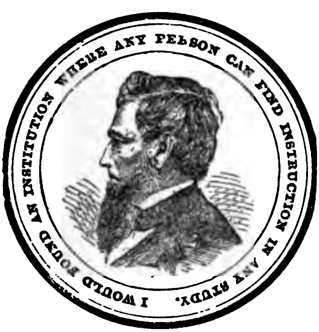

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THE CALENDAR.

1878	Sept. 17	Fall Term.
September 17	Tuesday	Entrance Examinations.
September 18	Wednesday	Entrance Examinations continued.
September 19	Thursday	REGISTRATION for the Term.
September 20	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 16	Monday	Term Examinations begin.
December 20	Friday	Term ends.
1879	**Jan. 7**	**Winter Term.**
January 7	Tuesday	Entrance Examinations.
January 8	Wednesday	Entrance Examinations continued.
January 9	Thursday	REGISTRATION for the Term.
January 10	Friday	Instruction begins.
January 11	Saturday	FOUNDER'S DAY.
February 22	Saturday	WASHINGTON'S BIRTHDAY.
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March 28	Friday	Term ends.

1879	April 5		Spring Term.
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April	7	Monday	Instruction begins.
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June	14	Saturday	Term Examinations end.
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September	19	Friday	Instruction begins.

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Annual meeting of the Board on the Wednesday before Commencement at 10 a. m.

OFFICERS OF THE BOARD.

HENRY W. SAGE, - - - - - - -	*Chairman.*
W. R. HUMPHREY, - - - - - -	*Secretary.*
J. W. WILLIAMS, - - - - - - -	*Treasurer.*

EXECUTIVE COMMITTEE.

HENRY B. LORD, *Chairman.*
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J. W. WILLIAMS, Treasurer,
Secretary of the Committee.

UNIVERSITY FACULTY.

Arranged, with the exception of Officers of the Faculty, in the order of seniority of appointment.

HONORABLE ANDREW. D. WHITE, LL.D., University Hill.
PRESIDENT, *Professor of History.*

WILLIAM CHANNING RUSSEL, LL.D., 83 E. Seneca St.
VICE-PRESIDENT, *Associate Professor of History and Professor of South European Languages.*

REV. WILLIAM D. WILSON, DD., LL.D., L.H.D., 109 Cascadilla.
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

WILLARD FISKE, M.A., PH.D., University Hill.
LIBRARIAN, *Professor of North European Languages.*

GEORGE C. CALDWELL, B.S., PH.D., University Hill.
Professor of Agricultural and Analytical Chemistry.
Secretary of the Faculty.

BURT G. WILDER, B.S., M.D., 148 E. Buffalo St.
Professor of Physiology, Comparative Anatomy and of Zoology.

GOLDWIN SMITH, LL.D., L.H.D,, Toronto, Canada.
Lecturer on English and Constitutional History.

JAMES LAW, F.R.V.C., University Hill.
Professor of Veterinary Medicine and Surgery.

ALBERT N. PRENTISS, M.S., University Avenue.
Professor of Botany, Horticulture and Arboriculture.

JOHN L. MORRIS, M.A., C.E., University Avenue.
SIBLEY *Professor of Mechanical Engineering and Machine Construction.*

T. FREDERICK CRANE, M.A., University Avenue.
Professor of Spanish and Italian and Assistant Professor of French.

ZIBA HAZARD POTTER, M.A., M.D., LL.B., 137 Cascadilla.
Assistant Professor of Mathematics.

CHARLES A. SCHAEFFER, M.A., PH.D., 103 E. Seneca.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK L. O. RŒHRIG, PH.D., M.D., 231 E. State St.
Professor of Sanscrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, M.A., LL.D., 58 Cascadilla.
Professor of Anglo-Saxon and English Literature.

WATERMAN T. HEWETT, M.A., University Avenue.
Assistant Professor of German.

BELA P. MACKOON, M.A., 93 E. Buffalo St.
Professor of German.

CHARLES H. WING, B.S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry.

ALFRED STEBBINS, M.A., 110 N. Aurora St.
Assistant Professor of South European Languages.

LUCIEN A. WAIT, B.A., Dryden Road.
Associate Professor of Mathematics.

TRACY PECK, M.A., 63 Eddy St.
Professor of the Latin Language and Literature.

ISAAC FLAGG, PH.D., 28 Mitchell St.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, M.A., University Avenue.
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, M.A., University Grounds.
Professor of Architecture.

JAMES EDWARD OLIVER, M.A., 51 Heustis St.
Professor of Mathematics.

WILLIAM A. ANTHONY, PH.B., 130 E. Buffalo St.
Professor of Physics and Experimental Mechanics.

JOHN E. SWEET, 145 Cascadilla.
Professor of Practical Mechanics and Director of the Machine Shop.

HJALMAR HJORTH BOYESEN, PH.D., [In Europe.]
Professor of German Literature and Assistant Professor of North European Languages.

ESTEVAN A. FUERTES, PH.B., C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN C. CLEAVES, B.S., Cortland.
Assistant Professor of Free-hand Drawing and of Mechanical Draughting.

ISAAC P. ROBERTS, M.AGR., University Farm.
Professor of Agriculture.

ABRAM A. BRENEMAN, B.S., 116 Cascadilla.
Assistant Professor of Analytical Chemistry and Lecturer on Industrial Chemistry.

THEODORE B. COMSTOCK, B.AGR., B.S., 144 Cascadilla.
Assistant Professor of General and Economic Geology.

CHARLES LEE CRANDALL, C.E., West Hill.
Assistant Professor of Engineering.

IRVING P. CHURCH, C.E., 105 Cascadilla.
Assistant Professor of Engineering.

HORATIO S. WHITE, B.A., University Avenue.
Assistant Professor of German Language and Literature.

J. HENRY COMSTOCK, B.S., University Hill.
Assistant Professor of Entomology, and Lecturer on the Zoology of Invertebrates.

WILLIAM R. DUDLEY, M.S., 108 Cascadilla.
Assistant Professor of Botany.

JAMES B. BURBANK, Brevet Major 3d Artillery, U.S.A., 135 E. Seneca St.
Professor of Military Science and Tactics.

GEORGE WILLIAM JONES, A.M., 175 E. State St.
Assistant Professor of Mathematics.

DAVID W. BROWN, PH.D., Cascadilla Cottage.
Assistant Professor of Latin and Greek.

OTHER UNIVERSITY OFFICERS.

SIMON H. GAGE, B.S.,
Instructor in Microscopy and Practical Physiology.

FRANK B. HINE, B.S.,
Instructor in Geology and Palæontology.

EDWARD P. JENNINGS, C.E.,
Instructor in Chemistry.

WALTER H. KENT, B.S.,
Instructor in Chemistry.

WILLIAM R. LAZENBY, AG.B.,
Instructor in Horticulture and Superintendent of the Botanical and General Garden.

WILLIAM E. LUCAS, PH.B.,
Instructor in Rhetoric and Compositon.

GEORGE S. MOLER, B.M.E.,
Instructor in Physics.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

FRANK A. WRIGHT,
Instructor in Architectural Drawing.

GEORGE W. HARRIS, PH.B.,
Assistant Librarian.

CHARLES P. WOODRUFF, B.S.,
Assistant in the Library

H. W. SNYDER,
Master of the Chimes.

M. J. SPAULDING,
Janitor.

SPECIAL FACULTIES.

AGRICULTURE—The PRESIDENT, Professor ROBERTS *Dean*, Professors CALDWELL, LAW, PRENTISS, WILDER, and J. H. COMSTOCK.

ARCHITECTURE—The PRESIDENT, Professor BABCOCK *Dean*, Professors FUERTES, OLIVER, and CLEAVES.

CHEMISTRY AND PHYSICS—The PRESIDENT, Professor SCHAEFFER *Dean*, Professors ANTHONY, CALDWELL, WING, and BRENEMAN,

CIVIL ENGINEERING—The PRESIDENT, Professor FUERTES *Dean*, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, CHURCH, and CRANDALL.

HISTORY AND POLITICAL SCIENCE.—The PRESIDENT *Dean*, Professors RUSSEL, GOLDWIN SMITH, and WILSON.

ANCIENT CLASSICAL LANGUAGES—The PRESIDENT, Professor PECK *Dean*, Professors FLAGG and BROWN.

NORTH EUROPEAN LANGUAGES—The PRESIDENT, Professor FISKE *Dean*, Professors BOYESEN, HEWETT, MACKOON, and WHITE.

SOUTH EUROPEAN LANGUAGES—The PRESIDENT, Professor RUSSEL *Dean*, Professors CRANE, RŒHRIG, and STEBBINS.

ANCIENT AND MODERN ASIATIC LANGUAGES—The PRESIDENT, Professors FISKE, RŒHRIG, and WILSON.

MATHEMATICS—The PRESIDENT, Professor OLIVER *Dean*, Professors ANTHONY, BABCOCK, FUERTES, JONES, MORRIS, POTTER, and WAIT.

THE SIBLEY COLLEGE OF MECHANIC ARTS—The PRESIDENT, Professor MORRIS *Dean*, Professors ANTHONY, BABCOCK, FUERTES, OLIVER, SWEET, and CLEAVES.

MILITARY SCIENCE AND TACTICS—The PRESIDENT, Professors BURBANK, WILSON, and POTTER.

NATURAL HISTORY—The PRESIDENT, Professor PRENTISS *Dean*, Professors LAW, WILDER, WILSON, T. B. COMSTOCK, J. H. COMSTOCK, and DUDLEY.

PHILOSOPHY AND LETTERS—The PRESIDENT, Professor SHACKFORD *Dean*, Professors CORSON and WILSON.

CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

AMES, WILLIS C., B.C.E., Cornell University
Engineering.

ANDREWS, SIDNEY F., Ph.B. Western University of Pa.
History and Political Science.

BISSELL, FRANK E., B.C.E. Cornell University
Engineering.

BOYLE, THOMAS G., Ph.B. Western University of Pa.
History and Political Science.

CALDWELL, ANDREW J., B.M.E. Maine State College
Mechanical Engineering.

DEWSNAP, SAMUEL G., B.S. Cornell University
Chemistry and Physics.

FALKENAU, A., B.M.E. Cornell University
Chemistry and Physics.

FARRINGTON, ARTHUR M., B.S. Maine State College
Veterinary Science.

HASKELL, NEWELL P., B.S., Maine State College
Chemistry and Physics.

HICKS, MARGARET, B.A., Cornell University
Architecture.

JORDAN, WHITMAN H., B.S., Maine State College
Chemistry and Physics.

KEITH, WILLIAM, B.S. Cornell University
Chemistry and Physics.

MAKEPEACE, M. D., B.C.E., Cornell University
Geology.

MAXWELL, FRANK A., B.C.E. Cornell University
Engineering.

MEAD, THEODORE L., B.C.E., Cornell University
Natural History.

OSMOND, ISAAC T., M.A. Mt. Union College
Physics and Mathematics.

PENNOCK, F. M., B.Agr., Cornell University
History and Literature.

PRESTON, EDWARD L., B.C.E. Cornell University
History and Political Science.

PRESTON, MAY, B.S., Hillsdale College
History and Literature.

SAUNDERS, CHARLES F., B.Arch. Cornell University
History and Political Science.

WASHBURNE, C. EDWARD, Ph.B., University of California
Chemistry and Physiology.

UNDERGRADUATES.

IN THE FOURTH YEAR OR SENIOR STUDIES.

Alberti, William Maxon,	New Market, N. J.,	*Science and Letters*
Bacon, Charles Putnam,	Hartford, Ct.,	*Philosophy*
Bailey, Henry,	Caughdenoy,	*Science and Letters*
Baker, George Titus,	Iowa City, Ia.,	*Optional*
Bakes, Robert Owen,	Vevay, Ind.,	*Agriculture*
Benchley, Paul Zeno,	Ithaca,	*Agriculture*
Blowers, Clarence Newman,	Syracuse,	*Science and Letters*
Borden, Thomas Paschal,	Washington, D. C.,	*Engineering*
Bradford, Edith Woodman,	Cambridge, Mass.,	*Science and Letters*
Buchman, Albert,	New York City,	*Architecture*
Cane, Abraham,	Plattsburgh,	*Arts*
Chandler, Walter,	Weldon, Ill.,	*Science and Letters*
Conde, Mary Frances,	Glenville,	*Literature*
Dounce, George Alexander,	Elmira,	*Arts*
Edwards, William Seymour,	Coalburg, W. Va.,	*Science and Letters*
Ferguson, Nicholas Ephraim,	New Milford,	*Engineering*
Fleischman, Adolph,	Albany,	*Architecture*
Fleming, George Claudius,	Ithaca,	*Arts*
Fleming, Minnie Miranda,	Ithaca,	*Literature*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature*
Gibson, Stanford Jay,	South New Berlin,	*Science and Letters*
Gifford, Harold,	Milwaukee, Wis.,	*Science and Letters*

Green, Hattie Lucina,	South Byron,	*Science and Letters*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hamilton, John Foster,	New York City,	*Optional*
Haskell, Eugene Elwin,	Forestville,	*Engineering*
Hathaway, Arthur Safford,	Decatur, Mich.,	*Mathematics*
Herman, Robert,	Washington, D. C.,	*Engineering*
Hill, Lena Lilian,	Isle La Motte, Vt.,	*Science and Letters*
Hostetler, Virgil Newland,	Decatur, Ill.,	*Science and Letters*
Howland, Edward Cole,	Poughkeepsie,	*Literature*
Ingalls, Willis Arnold,	Peterboro,	*Science and Letters*
Jackson, Caroline Cooke,	New York City,	*Science and Letters*
Kelley, Florence Molthrop,	Germantown, Pa.,	*Literature*
Kennedy, James Carroll,	Troy, Vt.,	*Engineering*
Kent, Robert Streator,	Bay Ridge,	*Science and Letters*
Kerr, Walter Craig,	St. Peter, Minn.,	*Mechanic Arts*
Kozima, Noriyuki,	Tokio, Japan,	*Architecture*
Lewis, John,	Ithaca,	*Mechanic Arts*
Lowenbein, Ernest,	New York City,	*Optional*
Lucas, Charles Otho,	Greenville, Ohio,	*Science and Letters*
Macy, Ervin Barnes,	Port Byron,	*Science and Letters*
Magner, Edmund,	Andover,	*Science and Letters*
Marx, Henry,	Toledo, O.,	*Mechanic Arts*
Mersereau, Charles Vernon,	Union,	*Engineering*
Millard, Alfred,	Omaha, Neb.,	*Science and Letters*
Mills, Harriet May,	Syracuse,	*Literature*
Moffat, Edmund Judson,	Chatham,	*Literature*
Morris, David Ellis,	Cincinnati, Ohio,	*Arts*
Morse, Edmund Royce,	Rutland, Vt.	*Science and Letters*
Newton, Whitney,	Denver, Col.,	*Science and Letters*
O'Connell, John Richard,	Barrytown,	*Engineering*
Olmsted, Allen Seymour,	Leroy,	*Optional*
Olney, Willard,	Westernville,	*Engineering*
Parke, Robert Augustus,	Binghamton,	*Mechanic Arts*
Patrick, Charles,	New Philadelphia, O.,	*Optional*
Patten, Elsie Manderville,	Binghamton,	*Literature*
Philipp, William Bernard,	Cincinnati, Ohio,	*Science and Letters*
Pierce, Charles Edwin,	Buffalo,	*Science and Letters*

Pitcher, Mary Merrill,	Owego,	*Arts*
Porter, Luther Henry,	East Orange, N. J.,	*Science and Letters*
Russel, Edward Channing,	Ithaca,	*Arts*
Russel, Sarah Jackson,	Ithaca,	*Literature*
Ryder, Clayton,	Carmel,	*Science and Letters*
Severance, Frank Hayward,	Whitewater, Wis.,	*Science and Letters*
Simons, Seward Adams,	Buffalo,	*Arts*
Simpson, George Frederic,	Lodi,	*Engineering*
Skinner, Frank Woodward,	Brownville,	*Engineering*
Smith, Fred Elias,	Moravia,	*Science and Letters*
Smith, William Joseph,	Charleston,	*Engineering*
Spaulding, Moses Jay,	East Poultney, Vt.,	*Science and Letters*
Tibiriçá, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Tomkins, Calvin,	Newark, N. J.,	*Science and Letters*
Warner, James Ward,	Rock Stream,	*Science and Letters*
Washburn, Alfred,	Chappaqua,	*Science and Letters*
Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Science and Letters*
Welles, George Matson,	Elmira,	*Science and Letters*
Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Woodward, Julius Hayden,	Brandon, Vt.,	*Science and Letters*
Wright, Frank Ayres,	Newburgh,	*Architecture*
Young, John Henry Weir,	Cold Spring,	*Natural History*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Adams, Edward Shields,	Chicago, Ill.,	*Optional*
Allison, Charles Rollo,	Oswego,	*Philosophy*
Arnold, George,	Rochester,	*Science and Letters*
Arrigunaga de, Joaquin Gutierez,	Campeche, Mexico,	*Agriculture*
Atwood, Charles Edwin,	Ithaca,	*Science and Letters*
Baker, William Apollos,	Yaphank,	*Science and Letters*
Beckwith, John Dorr,	Cedarville,	*Science and Letters*
Bird, William Noble Davis,	Ithaca,	*Agriculture*

Bissell, Esse Clarissa,	South Bend, Ind.,	*Science and Letters*
Bliss, Henry Dwight,	Holley,	*Agriculture*
Boyer, Arthur Grindage,	Aurora,	*Agriculture, Opt.*
Bronk, William,	New Baltimore,	*Arts, Opt.*
Buck, Helen Albertine,	Watkins,	*Science and Letters*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Natural History*
Carpenter, George,	Utica,	*Natural History, Opt.*
Carrier, William Harvey,	Phœnix,	*Agriculture*
Chevelier, Josephine,	New York,	*Chemistry, Special*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Science and Letters*
Cobb, Fred. Carlton,	Andover.	*Philosophy*
Cook, Charles Button,	Buffalo,	*Architecture*
Cramphin, Harry Alexander,	Morrisville,	*Science and Letters*
Cummings, Frederick Douglas,	Tully,	*Science and Letters*
Curtis, Frank Smith,	Moravia,	*Science and Letters*
Curtiss, Alexander Maine,	Buffalo,	*Chemistry, Special*
Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Eastman, Adelbert Lyon,	Arcade,	*Optional*
Ewing, Addison Luther,	La Grange, Wis.,	*Science and Letters*
Ferris, George Ferris,	Philadelphia, Pa.,	*Engineering*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchogue,	*Literature, Opt.*
Force, Lafayette,	Tekama, Neb.,	*Science and Letters*
Fox, Walter Howard,	Portland, Me.,	*Agriculture*
Gardner, William,	Syracuse,	*Science and Letters*
Gifford, George Francis,	Jamestown,	*Science and Letters*
Goodwin, DeWitt,	Dresserville,	*Science and Letters*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Gregory, Emily Lovira,	Buffalo,	*Literature*
Gregory, Edgar Warren,	Palmyra,	*Science and Letters*
Halpen, Annie Marie,	Albany,	*Science and Letters*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hayes, Rutherford Platt,	Fremont, O.,	*Science and Letters*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Hills, Harold Edwards,	Auburn,	*Science and Letters*
Humphrey, Charles,	Ithaca,	*Science and Letters*

Huntley, Willis Arnold,	Troy,	*Literature*
Irvine, Frank,	Sharon, Pa.,	*Science and Letters*
Johnson, Charles Haldam,	New York City,	*Arts, Opt.*
Jonas, Albert,	Buffalo,	*Optional*
Jones, Frank Henry,	Trumansburg,	*Agriculture, Opt.*
Kelley, Irving Washington,	Kelley's Island, O.,	*Engineering*
Kelley, William Datus,	Kelley's Island, O.,	*Engineering*
Kidder, Frank Eugene,	Bangor, Me.,	*Architecture, Opt.*
Knapp, James Louis,	Union,	*Science and Letters*
Landon, Eugene Ashbel,	Vineland, N. J.,	*Engineering*
Lathrop, Oscar Garland,	Ackworth, N. H.,	*Science*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science & Letters*
Lawrence, James Suydam,	Seneca Falls,	*Literature, Opt.*
Leary, James Thomas,	Ithaca,	*Science and Letters*
Leeds, Charles Starr,	Richmond, Ind.,	*Science and Letters*
Leighton, Herbert Jackson,	Ithaca,	*Mechanic Arts*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Mack, George William,	Ithaca,	*Mechanic Arts*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
Mendes, Octaviano Abdon Pereira,	S. Paulo, Brazil,	*Architecture*
Merry, Addison Delavan,	Phoenix,	*Science and Letters*
Mesick, David Wilson,	Kinderhook,	*Engineering*
Mesick, Frederic Peter,	Kinderhook,	*Engineering*
Messenger, Hiram John,	Cortland,	*Literature*
Mills, Arthur Eugene,	New York City,	*Architecture*
Morris, Robert Tuttle,	New Haven, Ct.,	*Natural History, Opt.*
Nixon, Charles Elstun,	Chicago, Ill.,	*Optional*
Norton, Henry Mark,	New York City,	*Agriculture*
Norton, James Eddy,	Belmont,	*Literature*
O'Brien, Michael John,	Bergen,	*Science*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston Mass.,	*Mechanic Arts*
Page, John,	Stafford,	*Engineering*
Pennock, Charles John,	Ithaca,	*Agriculture*
Phelps, Susanna Stuart,	Morrisville,	*Philosophy*
Pierce, Henry,	Pawling,	*Engineering*

Poole, Murray Edward,	Ithaca,	*Arts, Opt.*
Randolph, Nathaniel Archer,	Chadd's Ford, Pa.,	*Science*
Reeve, Benjamin Harry,	Mattituck,	*Optional*
Roberts, Mary Elizabeth,	Ithaca,	*Philosophy*
Rose, Alice Evelyn,	Cleveland, O.,	*Science and Letters*
Rudd, Willis Nathaniel,	Ithaca,	*Science*
Rundell, Forest Parlen,	De Kalb Junction,	*Optional*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Schumm, George,	San Francisco, Cal.,	*Optional*
Scott, Frank Jeremiah,	Jordon, Minn,,	*Mechanic Arts*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*
Sheldon, Charles Stiles,	Oswego,	*Natural History*
Sibley, Edwin Henry,	Franklin, Pa.,	*Arts*
Slauson, Allan Bedient,	Weedsport,	*Philosophy*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Smith, Raymond Lee,	Ithaca,	*Optional*
Snyder, Harry Wilson,	Freeport, Ill.,	*Agriculture, Opt.*
Soule, Henry Howard,	Syracuse,	*Science and Letters*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Science and Letters*
Stricker, Enoch Leon,	Tiffin, O.,	*Philosophy, Opt.*
Terry, Edmund Burke,	Waterville,	*Science and Letters*
Thomas, Frank Salter,	Bay Ridge,	*Science and Letters*
Tidball, John Satterlee,	Fort Monroe, Va.,	*Science and Letters*
Tiffany, Frank Giles,	Gainesville,	*Science and Letters*
Tilton, John Neal,	Rome, Italy,	*Architecture*
Tracy, Aurelius Milford,	Ghent,	*Science and Letters*
Trelease, William,	Brooklyn,	*Natural History*
Turner, Samuel Bates,	Ithaca,	*Literature*
Upjohn, Richard Russell,	Brooklyn,	*Engineering*
Vail, Alfred Tennyson,	Chester,	*Science*
Vance, Lee James,	Penn Yan,	*Science and Letters*
Wagner, Charles Gray,	Whitesboro,	*Natural History*
Waterbury, John Calvin,	Rensselaerville,	*Mechanic Arts, Opt.*
Webster, Hosea,	Oyster Bay,	*Science and Letters*
White, Fred. Davis,	Ithaca,	*Science and Letters*

Whitney, Frank Curtis,	West Danby,	*Arts*
Wilhelm, Henry Walter,	Toledo, O.,	*Optional*
Wilson, James Meredith,	Riverton, Ill.,	*Philosophy, Opt.*
Wing, Albert John,	Albany,	*Science and Letters*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Ainslie, James Stewert,	Hartwick,	*Arts*
Allen, John Granger,	Aurora,	*Mechanic Arts*
Alling, Robert Bertine,	Bangall,	*Science and Letters*
Ayers, William Judson,	Cairo, Ill.,	*Science and Letters*
Aylen, Henry,	Aylmer, Canada,	*Philosophy, Opt.*
Barnes, Justin Llewellyn,	Boston, Mass.,	*Science and Letters*
Bates, William Horatio,	Washington, D. C.,	*Agriculture*
Battin, Henry Wilson,	Albany,	*Engineering*
Beach, William Brewster,	Brooklyn,	*Agriculture*
Benedict, Thomas, Jr.,	Pittston, Pa.,	*Engineering*
Bennitt, Francis Marion,	Big Flats,	*Optional*
Booth, Quentin Woodbury,	Rochester,	*Mechanic Arts*
Bowman, Seward Lincoln,	New Lisbon, O.,	*Science and Letters*
Boyer, Lyman Fremont,	Freeport, Ill.,	*Science and Letters*
Brader, William Barton,	White Haven, Pa.,	*Optional*
Brown, William Clinton,	Sandusky, O.,	*Mechanic Arts*
Bullis, Abram Rogers,	Macedon,	*Mathematics*
Burr, Ella,	Newark Valley,	*Literature*
Burr, George Lincoln,	Newark Valley,	*Arts*
Campbell, Edwin,	Mumford,	*Science and Letters*
Candee, Fred Jason,	Moline, Ill.,	*Optional*
Carey, Frank,	Fond du Lac, Wis.,	*Science and Letters*
Carman, Frederick Douglass,	Jacksonville,	*Arts*
Cartwright, Robert, Henry,	Rochester,	*Mechanic Arts*
Catchpole, Edwin Watson,	Rose,	*Agriculture*
Chapman, Edwin Lyon,	Monroe, Mich.,	*Science and Letters*
Cheney, Miles Eugene,	Bemus' Point,	*Philosophy*
Chittenden, Frank Hurlbut,	Brooklyn,	*Natural History, Opt*
Clarke, Percy Edwards,	Washington, D. C.,	*Science and Letters*

Ernest Henry,	St. Louis, Mo.,	*Science and Letters*
s, Homer,	Rochester,	*Optional*
ann, John Saunders,	Freeford Falls, Ill.,	*Science and Letters*
lin, Henry Sisson,	Poughkeepsie,	*Arts, Opt.*
Fred Malin,	Jordan,	*Science*
ll, George,	Central Valley,	*Science and Letters*
s, Albert Hutchingson,	Cleveland, O.,	*Science and Letters*
e, Fred Cooper,	West Winsted, Ct.,	*Natural History*
port, Arthur Clinton,	Varna,	*Arts*
Harriet McHarg,	Cooperstown,	*Arts*
ick, DeWitt Clinton,	Gallupville,	*Science and Letters*
ing, Elizabeth,	Ithaca,	*Science and Letters*
her, Frederick Matthias,	Watertown,	*Literature, Opt.*
, Otto Marc,	New York City,	*Engineering*
l, Annie Laurie,	Worcester, Mass.,	*Literature, Opt.*
an, Walter Jerome,	Binghamton,	*Arts*
Phebe Irene,	Albany,	*Science and Letters*
ian, George Wiley,	Dover, N. H.,	*Engineering*
t, Rizpah Margaret,	Le Roy,	*Philosophy*
rd, Alice,	Worcester, Mass.,	*Arts*
s, Spencer Coleman,	Chilesburg, Ky.,	*Nat. History, Opt.*
h, William Ross,	Brooklyn,	*Optional*
an, William Ball,	Carbondale, Pa.,	*Optional*
rf, Moses,	Fremont, O.,	*Literature*
, Albert George Charles,	Brooklyn,	*Agriculture*
n, David Patrick,	Albany,	*Science and Letters, Opt.*
y, David Rogers,	Bridgehampton,	*Arts*
ng, Frank,	Callicoon,	*Science and Letters*
w, Gertrude Burt,	Syracuse,	*Arts, Opt.*
ins, Carlton Richmond,	East Hamburg,	*Engineering*
ck, William Porter,	East Randolph,	*Philosophy*
Harriet,	Dunkirk,	*Literature*
William Isaac,	Aurora,	*Natural History*
mb, James Warren,	Ravenna, O.,	*Science and Letters*
es, Joseph Austin,	Laurens, S. C.,	*Agriculture*
es, William David,	Pittsburgh, Pa.,	*Chem. and Physics*
r, Charles West,	New Orleans, La.,	*Science and Letters*

Hough, Romeyn Beck,	Lowville,	*Arts, Opt.*
House, Edward Mandle,	Houston, Texas,	*Science and Letters*
Howell, Frederic James,	Keokuk, Iowa,	*Science and Letters, Opt.*
Howland, Isabel,	Sherwood,	*Philosophy*
Hoyt, William Ballard,	East Aurora,	*Philosophy*
Hungerford, Nye,	Ithaca,	*Agriculture*
Hunter, Nathaniel Perry,	Jasper,	*Arts, Opt.*
Jaynes, DeLos Dan,	North Norwich,	*Science and Letters*
Kelso, John Sinclair,	Stamford, Ct.,	*Engineering, Opt.*
Kilbourne, Frederic Lucius,	Moravia,	*Agriculture*
Latham, William Arthur Swaby,	Seneca Falls,	*Science and Letters, Opt.*
Leonard, Edwin Jones,	Davenport, Ia.,	*Science and Letters, Opt.*
Locke, Henry Lincoln,	West Dedham, Mass.,	*Agriculture*
Lounsberry, John Wesley,	Hammondsport,	*Literature, Opt.*
Martin, George,	Alleghany City, Pa.,	*Optional*
Marvin, Charles Deming,	Montclair, N. J.,	*Architecture*
McArthur, William Carse,	Burlington, Ia.,	*Science and Letters, Opt.*
McConnell, Benjamin Franklin,	Chicago, Ill.,	*Optional*
McCorn, William Alfred,	Newfield,	*Natural History, Opt.*
McCrea, Clark Waldo,	Eagle Rock, Pa.,	*Engineering*
Miller, Irvine,	Washington, D. C.,	*Literature*
Moses, Willis Holley,	Malone,	*Science and Letters*
Munson, George,	New York,	*Optional*
Moulton, Guy,	Cicero,	*Science and Letters*
Neymann, Olga,	New York City,	*Literature*
Northrop, May,	Woodhull,	*Science and Letters*
Ostrander, Will Sterling,	Schuylerville,	*Science and Letters*
Palmer, Elgar Anson,	Cortland,	*Mechanic Arts*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Parke, Henry Tyllmann,	Binghamton,	*Arts, Opt.*
Par[illegible], Robert Murray,	Cleveland, O.,	*Science and Letters*
Parmenter, Syrel,	Cohocton,	*Science and Letters*
Pe[illegible], Ida May,	Wilmington, Del.,	*Optional*
P[illegible], John Johnston,	Brooklyn,	*Engineering, Opt.*
P[illegible], Ira Adelbert,	Alfred Centre,	*Arts*
R[illegible] Edwin,	Greenpoint,	*Engineering*
R[illegible], Kate,	Trempealeau, Wis.,	*Optional*

Rich, Fred William,	West Potsdam,	*Science*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Roberts, David Evan,	Constableville,	*Optional*
Roehrig, Fred Lewis,	Ithaca,	*Architecture*
Ryman, Frederick Sweasy,	Dallas, Pa.,	*Optional*
Salisbury, Herbert Lucius,	Marcellus,	*Mechanic Arts*
Saunders, Charles Lockard,	Omaha, Neb.,	*Optional*
Schuyler, Sage White,	Ithaca,	*Mechanic Arts, Opt.*
Seymour, Frederick Hubert,	Lockport,	*Optional*
Shi[illegible]kle, John Newton Dexter,	Rochelle, Ill.,	*Science and Letters*
Shiras, George,	Pittsburgh, Pa.,	*Science and Letters*
Shu[illegible]ble, Emile Ralph,	Chicago, Ill.,	*Engineering*
Simmons, Parke Edmund,	Clarence, Ia.,	*Arts, Opt.*
Skinner, James Henry,	Faribault, Minn.,	*Science and Letters*
Smith, Edward Sholl,	Canajoharie,	*Science and Letters*
Smith, Theobald,	Albany,	*Philosophy*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Sp[illegible]er, Stella Diantha,	Unadilla,	*Philosophy, Opt.*
Sta[illegible]baugh, Henry Hamilton,	Youngstown, O.,	*Optional*
Ste[illegible]ns, James Brainard,	Rouse's Point,	*Arts*
Sto[illegible]y, William,	Rochester,	*Engineering*
Stu[illegible]ey, Duane,	South Byron,	*Science and Letters*
Taylor, Martin Albert,	Ithaca,	*Science and Letters*
Taylor, Oscar Livingstone,	Freeport, Ill.,	*Science and Letters*
Te[illegible]e, Clara Louisa,	Caribou, Me.,	*Science and Letters*
Thomas, Charles Elu,	Waterloo,	*Agriculture*
Thompson, Ervin William,	Smithville, Ga.,	*Mechanic Arts*
Tompkins, Myron,	Ithaca,	*Optional*
Trainer, John Walter,	Steubenville, O.,	*Optional*
Up[illegible]n, Charles Olmsted,	Clymer,	*Agriculture*
Van Ness, James Robertson,	Osborn's Bridge,	*Science and Letters*
Vaughan, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Wallenbeck, George,	Watkins,	*Chemistry, Special*
Walters, William Andrew,	Phoenix,	*Architecture*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	[illegible]
Wendell, Henry Ten Eyck,	Chicago,	[illegible]

Wick, Richard Brown,	Pittsburgh, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wilson, Josiah Dustin,	N. Haverhill, N. H.,	*Chem. and Physics*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy,	*Arts*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Adams, John Davis,	Plainville, N. J.,	*Literature*
Arnold, Bishop,	Rochester,	*Mechanic Arts*
Ayeres, Mary Frances,	Ithaca,	*Literature*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Ballard, Eugene Forrest,	Black Hawk, Col.,	*Literature*
Barber, Edwin Louis,	Wauseon, O.,	*Science and Letters*
Becher, Franklin Augustus,	Milwaukee, Wis.,	*Science and Letters*
Beebe, George,	Penn Yan,	*Science and Letters*
Bellows, Elmer Ellsworth,	Albany,	*Mechanic Arts*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown, Arthur Page,	Adams,	*Architecture*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	New York City,	*Agriculture*
Busch, John,	Ellenville,	*Chem. and Physics*
Carolan, Frank,	San Francisco, Cal.,	*Science and Letters*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carmody, Thomas,	Bellona,	*Science and Letters*
Carpenter, Calvin,	Troy,	*Science and Letters*
Carson, William,	St. Paul, Minn.,	*Optional*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chandler, Frances Harden,	Concord, N. H.,	*Optional*
Chester, Frederic Dixon,	St. Louis, Mo.,	*Science and Letters*
Coe, Alfred Byron,	Oswego,	*Science and Letters*
Cole, Chester Glen,	Corning,	*Literature*
Cole, Romaine Clark,	Utica,	*Science*
Cooper, Jere Frank Bower,	Polo, Ill.,	*Arts, Opt.*

ll, Alexander Tyng,	Erie, Pa.,	*Literature*
r, Rollin Frederick,	Greenville, O.,	*Science and Letters*
s, Ida Maynard,	Boston, Mass.,	*Science and Letters*
ng, Harry Platt,	Cleveland, O.,	*Philosophy*
, Ida Frances,	Easton,	*Optional*
e, Henry Montgomery,	Marshall, Mich.,	*Literature*
itzer, Walter,	New York City,	*Optional*
er, John Alonzo,	Eden, Ga.,	*Arts*
anks, Leland,	New York City,	*Mechanic Arts*
hild, Tracy Rasselas,	Ovid,	*Engineering*
Ephraim John,	Lebanon,	*Science and Letters*
, Ferdinand Comstock,	Maquoketa, Ia.,	*Architecture*
ar, Edward Louis,	Boston, Mass.,	*Mechanic Arts*
er, Mary,	Governeur,	*Science and Letters*
Francis Beaman,	Antwerp,	*Optional*
t, Edith,	New York City,	*Philosophy*
nis, Clara Louise,	River Head,	*Literature, Opt.*
ling, William Elias,	Bethany,	*Optional*
h, Arthur Gillespie,	Perry,	*Philosophy*
mans, Thaddeus Willson,	Chicago, Ill.,	*Mechanic Arts*
Laura,	St. Johnsville,	*Optional*
ock, Albert King,	Syracuse,	*Arts*
nan, Julian,	Bolton, Mass.,	*Agriculture*
r, Norton Townshend,	Wellington, O.,	*Science and Letters*
r, Rollin Cortland,	Wellengton, O.,	*Science and Letters*
ea, Joseph Chase,	Clifton, O.,	*Mechanic Arts*
chinson, Douglas Welton,	Chicago, Ill.,	*Science and Letters*
rsoll, John Carter,	Washington, D. C.,	*Optional*
son, Edward Newton,	Reading, Pa.,	*Arts*
s, George Augustus,	Addison, Ia.,	*Agriculture*
s, Hervey Brayton,	Westernville,	*Optional*
ney, Eudorus Catline,	Truxton,	*Mathematics*
, Samuel Leonard,	Clifton Heights, Pa.,	*Mechanic Arts*
, William Archie,	Oil City, Pa.,	*Science and Letters*
ler, Francis Henry,	Keesville,	*Arts, Opt.*
i, Hermann,	Oswego,	*Engineering*
y, Frank,	Ithaca,	*Science and Letters*

Luckey, Frank Ranney,	Poughkeepsie,	*Science and Letters*
Matthews, Peter Baldey,	Plainfield, N. J.,	*Mechanic Arts*
McDermid, Andrew Jackson,	Marshall, Mich.,	*Agriculture*
McLennan, Christiana,	Elgin,	*Science and Letters*
Minshall, Charles,	Terre Haute, Ind.,	*Optional*
Morton, Oliver Throck,	Indianapolis, Ind.,	*Arts, Opt.*
Moses, Fred Augustus,	Rochester,	*Engineering*
Mott, Seward,	Bouckville,	*Natural History*
Murphy, Smith,	Moravia,	*Agriculture*
Nichols, Harvey Bartlett,	Fond du Lac, Wis.,	*Science and Letters*
Pennock Theodore,	Ithaca,	*Agriculture, Opt.*
Pfeiffer, Edward Philip,	New York City,	*Optional*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*
Pitcher, Charles Daniel,	Owego,	*Arts*
Potter, Bina Abigal,	Ithaca,	*Agriculture, Opt.*
Pratt, Ransom,	Corning,	*Science and Letters*
Purdy, Markwell Seward,	Corning,	*Arts*
Putnam, Mary Chastina,	Ellington,	*Literature*
Raekemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walter Glazier,	Minetto,	*Science and Letters*
Reading, William Barton,	West Falls,	*Optional*
Reed, James Ackerson,	Ontario,	*Arts*
Robie, Harry Adams,	Marathon,	*Mechanic Arts*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Root, Daniel Bayard,	Port Byron,	*Arts*
Rüdiger, John Max,	Brooklyn,	*Mechanic Arts, Opt.*
Ruger, Crawford Proser,	Syracuse,	*Arts, Opt.*
Sanders, Alvin Howard,	Chicago, Ill.,	*Science and Letters*
Sazé, Hidesaburo,	Fukashima, Japan,	*Agriculture*
Schenck, Robert Dana,	Union Springs,	*Science and Letters*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Serat, Mortimer Edgerton,	Elmira,	*Mechanic Arts*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Literature*
Shorter, Thomas Jaye,	Aurora,	*Optional*
Sibley, Lacy Culver,	Cuba,	*Science and Letters*
Smith, Delano Eugene,	New York City,	*Arts*
Smith, Henry Willis,	Woodbourne,	*Science and Letters*

h, Hermon Woodworth,	Trumansburg,	*Science and Letters*
h, Isaac Parshall,	Ithaca,	*Arts*
h, Joseph Lesley,	Canajoharie,	*Optional*
h, Morace Francis,	McLean,	*Arts*
mers, Frederick Skelding,	Ithaca,	*Science and Letters*
r, Grace Weld,	Waltham, Mass.,	*Arts*
er, Richard Francis,	Corry, Pa.,	*Philosophy*
ens, Clauda Justus,	Kenton, O.,	*Science and Letters*
eter, Howard Malcolm,	Tunkhannock, Pa.,	*Arts*
lam, Frederick,	Baldwinsville,	*Science and Letters*
or, William Montgomery,	Rochelle, Ill.,	*Agriculture, Opt.*
mas, Charles Hendrick,	Wolcott,	*Science and Letters, Opt.*
mpson, Madeline Sylvester,	Ithaca,	*Science and Letters*
mbull, William,	Sandy Hill,	*Engineering*
ker, John Thomas,	Varna,	*Agriculture, Opt.*
per, Leonidas Harvey,	Decatur, Ill.,	*Agriculture*
ill, James Fred,	Corning,	*Philosophy*
Pelt, Elizabeth Vandenburg,	Trumansburg,	*Science and Letters*
Pelt, Gertrude Wyckoff,	Trumansburg,	*Science and Letters*
t, John Cassan,	Norwich,	*Engineering*
do, Gerald,	Scotland, Ct.,	*Agriculture*
shburne Frank Sherman,	Chicago, Ill.,	*Engineering*
bster, John Guerdon,	Bath,	*Natural History*
kinson, Marion,	Syracuse,	*Arts*
liams, Isaac,	Niagara, Canada,	*Agriculture*
son, Dora Frank,	Ithaca,	*Science and Letters*
son, Frank Thomas,	Corry, Pa.,	*Science and Letters*
odard, James Allen,	Elma,	*.. Opt.*
odruff, Edwin Hamlin,	Ithaca,	*Science and Letters*
ght, George Herdman,	Buffalo,	*Arts*
nkoop, Tobias Bion,	Ithaca,	*Agriculture*
w, Everett,	Lawrence, Mass.,	*Arts*

SUMMARY BY YEARS.

Post Graduates	21
In Senior or Fourth Year Studies	83
In Junior or Third Year Studies	123
In Sophomore or Second Year Studies	145
In Freshman or First Year Studies	133
	505

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	9	10	18	23	60
Literature	10	8	8	11	37
Philosophy	1	8	8	6	23
Science and Letters	33	38	43	38	152
Science	0	6	2	1	9
Mathematics	1	0	1	1	3
Natural History	1	7	5	2	15
Agriculture	2	12	12	15	41
Architecture	4	5	4	3	16
Chemistry and Physics	0	2	3	1	6
Civil Engineering	12	12	13	6	43
Mechanic Arts	5	6	10	12	33
Optional	5	9	18	14	46
Total of Undergraduates					484
Post Graduates					21
Total in the University,					505

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868–69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds. "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next *after the* twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows :—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers,* some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work: but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

The University is situated on grounds overlooking ITHACA, a town of about twelve thousand inhabitants, at the head of Cayuga Lake, in Tompkins County, New York.

The town has five distinct lines of communication with the great thoroughfares, viz:

The *Geneva, Ithaca and Sayre Railroad,* running south, connecting with the Lehigh Valley Railroad for Towanda, Bethlehem, Philadelphia, etc; running north-west to Geneva and Lyons on the New York Central and Hudson River Railroad. The *Cayuga Railway,* running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga Lake Steamers,* during navigation, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga and Susquehanna Division* of the *Delaware, Lackawanna and Western Railroad,* running south to Owego on the New York, Lake Erie and Western (formerly Erie) Railway. The *Utica, Ithaca and Elmira Railway* starts from the immediate vicinity of the University buildings and, running north-east, connects at Cortland for Syracuse and at Canastota with the New York Central and Hudson River Railroad; running south-west to Elmira on the New York, Lake Erie and Western (Erie) Railway, connects with the Northern Central Railway for Harrisburg, Baltimore, Washington, etc.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words :—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge*. Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "*Theory of Heat,*" *Schellen's* "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred (1) on those who have completed the five years course and (2) on those who take the Bachelor's degree in Engineering, after two years spent in practice and study, on passing the requisite examinations and presenting a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science is intended to embrace all the important topics connected with political and social science.

The following is a list of the lectures given in this department: (1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2) Modern history, and the philosophy of modern history, by President White. (3) The general and constitutional history of England, by Professor Goldwin Smith. (4) General history, and the philosophy of history, by Professor Wilson. (5) History of the United States, by Professor Russel. (6) Political economy, by Professor Wilson. (7) A course of lectures on the constitution of the United States and American jurisprudence, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

1. SCHOOL OF THE ANCIENT LANGUAGES.

1. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elementary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos, Turkish*, the *Tartar Languages, Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year*,—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees have authorized and instructed the Faculty to make such arrangements that any student may, *after his first year in the University*, substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students that take Drill must continue it through the term. They are required to provide themselves with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe.

The object of the Drill and Military Instruction is not merely that knowledge of tactics and military evolutions that is required of the practical soldier. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term, and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma.

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies —Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy and transcendental logic.

Second Term.—Moral philosophy theories or morals and the development of moral sentiments. For the present Moral Philosophy and Political Economy alternate with each other, each subject being treated only once in two years. The Junior and Senior classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a course of lectures on the Philosophy of History. And in the third term of that year a course of lectures is delivered on Law and Jurisprudence, including the three branches, Constitutional, International, and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's *Brut or Chronicle* of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions ; readings from Shakespeare and Burke. *Second Term.* —Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose ; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds; but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require; and in fact they are so used on all occasions when the University Sermons spoken of above—under the head of religious instruction, are delivered.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

I. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake*; a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five *thousand* square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby: (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell; (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

Beginnings of a Museum in this department have been made by the following acquisitions: (1) A number of large portraits, busts and medallions of persons connected with the History of the University; (2) A number of bronze copies of masterpieces of statuary, by Barbedienne and others; (3) A collection of over 1500 large photographs, illustrating the architecture and sculpture of the principal ancient and modern nations and periods of art; (4) A considerable collection of casts, illustrating the History of Art, from the establishment of Brucciani in London, from the *Moulage* of the Louvre, and from the Modeling Establishment connected with the Museum of Berlin; (5) A large number of engravings illustrative of Christian Art and of the History of Art in general, including a very full set of the publications of the Arundel Society illustrative of Early Christian Art, a full set of Piranesi, the Heliotype reproductions of the Gray Collection, etc.; (6) A collection embracing about 700 specimens of Medallion Casts, from the Stosch and other German collections, made by Eichler of Berlin; (7) A collection of drawings and casts made under the direction of the South Kensington Museum and the Academies of Fine Arts in Paris and Berlin, and similar Institutions, arranged for the use of students in Free Hand Drawing, especially with reference to the needs of the department of Architecture; (8) A large collection of proofs and other engravings illustrative of recent art, especially of the German and French schools.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All Optional students, and students for the Courses in Agriculture and the Mechanic Arts will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations, including Radicals.

Regents' *Certificates* issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography, and English Grammar.

Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by the Academies and High Schools of the State of New York whose requirements for graduation are approved by the Faculty and whose course of study requires Physiology and Plane Geometry, will be accepted instead of an entrance examination in all the subjects above named except Algebra.

Graduates of Academies and High Schools of the State of New York *who have taken Diplomas* issued by the Regents of the State of New York will be admitted to the University as optional students and as students in the Courses of Agriculture and the Mechanic Arts without examination, on the presentation of their diplomas.

2. For admission to the courses in Architecture, Civil Engineering, and Mathematics, besides what is mentioned above, an examination will be required in Solid Geometry, and Plane Trigonometry (those books preferred in which the trigonometric functions are treated as ratios), including the theory and use of Logarithms.

3. Of all candidates for admission to the courses in Science, Science and Letters, Literature, Philosophy, Mathematics, Natural History, and Chemistry and Physics, examinations will be required, besides those named in the first paragraph above, either in (1) the

principles of French Grammar, the translation of English into French, and of three books of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar, the translation of English into German (Whitney's or Comfort's German Grammar preferred), and seventy-five pages of Whitney's Reader or its equivalent; or (except for the course in Mathematics), (3) Algebra entire (*any of the larger ones*), Solid Geometry, and Trigonometry, Plane and Spherical.

Students who wish to enter any one of the above named courses and are not prepared with the French, the German, or the extra mathematics, can enter as optional students and make up these deficiencies by reciting with the classes in the University.

4. For the Course in Natural History, candidates will be examined also in Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

5. For the Course in Literature and that in Philosophy, besides the general entrance examinations and the French or German, they will be examined in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Catiline, eight orations of Cicero, or five orations and the *de Senectute*, Virgil's Eclogues, and six books of the Æneid.

6. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, Latin the same as for the Course in Literature, with the addition of an examination in Greek; Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

7. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

The character of the examinations is sufficiently indicated by the Examination Papers which are given as specimens below, pp. 105 etc.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he come from another college or university, with the "Dismissal" described below, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

The Entrance Examinations will be held on the days indicated in the calendar on the 7th page of the Register.

The examinations for June and January will begin at 9 o'clock a. m.; that in September at 10 a. m., with a recess from 1.30 to 2.30 in the afternoon.

The examinations of the 1st day will be in Arithmetic, Algebra through Quadratics, and Plane Geometry.

On the second day, Physiology at 8 a. m., Geography at 10 a. m., and English Grammar and Orthography 2.30 p. m.

On the third day beginning at 9 a. m., French, German, and Greek, Solid Geometry 8 a. m., Advanced Algebra 10.30 a. m., Latin and Trigonometry 2.30 in the afternoon.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the time appointed for the next entrance examination, except in cases where very urgent reasons have prevented the student being present at the regular entrance examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission *after having passed at least one term's examinations.* They will, on such a testimonial, coming from any college or university whose requirements for admission are equivalent to our own, be admitted to the

University without further examinations. The testimonial must certify to both good character and good scholarship.

Such a dismissal will admit the applicant to the University as *an optional student*, or to the Courses in Agriculture and the Mechanic Arts without further examination.

But if the applicant wishes to enter any one of the Courses that requires for admission anything more than the six subjects named, 1, p. 78, he must pass the additional examinations required for admission to the Course.

And in case he wants to be admitted to an advanced class in any subject, he must apply to the professor in charge of the department whose class he proposes to enter, and undergo such examinations as he may require.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, without having entered any other college or university, will be required to pass the entrance examinations. They will then be in the same relation to the classes as those that have come from other colleges.

Such students are *in no case* admitted at *once* to any advanced standing as Sophomore, Junior or Senior.

The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

TIME REQUIRED FOR GRADUATION.

No student will be permitted to graduate who has not pursued the studies of his course for four entire years in this University; except those who, having pursued part of the studies of their course before coming here, propose to enter at an advanced standing. But in order to do so they must pass up, before the close of their first year, in all the studies that have been pursued by the class they intend to enter. And students who, by sickness or absence on leave, have lost a part of their time will be allowed in

some cases to take more than the regular studies of their course by asking permission of the Faculty at the beginning of each term. Otherwise no extra studies will be taken into account in considering the qualifications for graduation.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations, or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENÇE will be conferred on graduates in the Course in Philosophy on the same conditions as though they had graduated in the Course in Science.

The degree of CIVIL ENGINEER will be conferred (1) on Bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presentation of a satisfactory thesis; (2), on those who have completed the five years course, at their graduation.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of the University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course of Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications for examination and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.

2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.

3. In order to encourage the study of Agriculture and the sciences more immediately related to it, the Trustees decided to give free tuition to all students in Agriculture; and in 1877, at the expiration of the first period, they voted to extend the same favor to that class of students for three years more. Under this rule free tuition is given to agricultural students who are pursuing either the three or the four years course and *intending to complete* the course.

For all others the tuition fees are twenty-five dollars a term.

There is also a charge of five dollars as a graduation fee which must be paid by each student before taking any Baccalaureate Diploma, and the same sum for any second degree.

No matriculation or entrance fees are required, nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

EXPENSES OF RESIDENCE.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - -	$ 75.00
Room, board, lights and fuel, about - - - -	240.00
Total, - - - - - - .	$315.0c

Cascadilla Place is owned by the University, and is rented to professors and students, each taking one room or more as he may choose. There is a janitor living in the building to take care of it and do such work for the inmates as they may choose to employ him to do.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and lights, varies from $5.50 to $7.50 per week. The rooms are all furnished and carpeted. Students occupying one of the most desirable rooms alone, pay $7.50 per week. If two occupy such rooms together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 each per week. The entire building is warmed by steam, and in most rooms the sleeping apartments are separate from the ordinary studying room. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The courses of study are arranged in four classes: (1.) those aiming at general culture; (2) those aiming at special culture in some departments; (3) technical courses or those that are designed to prepare the students for some kind of practical work; (4.) partial courses leading to no degree.

In stating the courses the figures in parentheses ( ) indicate the number of recitations or lectures per week, and studies named in *italics* are optional, and those with an "*or*" between them are equivalents for each other.

In computing Laboratory Practice two hours and a half of actual work are regarded as equal to one recitation.

In Draughting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. GENERAL COURSES.

1. THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1); *physiology, French, German, mathematics, chemistry, experimental mechanies* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism* (6).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, chemistry, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (12).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term.—Logic (3); essays and criticism (1); *Greek, Latin, modern languages, English literature, mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors; *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

2. THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (4); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman empire (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

3. THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Monday in the term.

Second Term.—Geometry (5); Latin (4); French *or* German (5); zoology (3).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); astronomy (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); analytical geometry (5): electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—German *or* French (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice, chemical or botanical (5); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (5); chemistry (2); geology (3): heat (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history, science *or* languages (8); acoustics and optics (3); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

4. The Course in Science and Letters.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning the first Monday in the term.

Second Term.—Geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); rhetorical exercises (1); science *or* modern languages (3).

Second Term.—French *or* German (3); zoology (3); chemistry (3); rhetorical exercises (1); analytical geometry *or* science and modern languages (5).

Third Term.—French *or* German (3); botany (3); chemistry (3); rhetorical exercises (1); calculus *or* modern languages and science (5).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); geology (3); physics (3); English literature (1); essays (1).

Second Term.—Moral philosophy (2); history of the Roman empire (5); physics (3); English literature (1); essays (1); *optional* (3).

Third Term.—Logic (3); mediæval history (5); physics (2); English literature (1); essays (1); *optional* (3).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

II. SPECIAL COURSES.

Leading to the Degree of Bachelor of Science.

1. The Course in Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Solid geometry (5); French (5) and German (3) *or* German (5) and French (3); zoology (3).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); experimental mechanics (3); rhetorical exercises (1).

Second Term.—French *or* German (3); zoology (3); analytical geometry (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—French *or* German (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice, chemical or botanical (5); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (2); chemistry (2); geology (3); English literature (1); essays (1); *optional,* six hours, of which at least three must be given to one of the following sciences: *botany, chemistry* or *zoology.*

Second Term.—Acoustics and optics (3); geology (3); English literature (1); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry* (including *mineralogy*) or *zoology.*

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (1); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry, geology* or *zoology.*

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

2. THE COURSE IN MATHEMATICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Algebra (2); spherical trigonometry (3); French and German (8); rhetoric and composition (2); linear draughting (2).

Third Term.—Harmonoid geometry (3); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (2); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); astronomy (3); shades, shadows and perspective (3); modern history (3); geology (3); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); philosophy of history (3); English literature (1); *optional* (5).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6.)

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

3. THE COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—French and German (8); rhetoric (2); free-hand drawing (5); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); rhetoric (1); lectures on human physiology (3); lectures and laboratory work in anatomy (3); experimental mechanics (3); organic chemistry (2).

Second Term.—French *or* German (3); rhetoric (1); lectures on zoology (3); lecture and laboratory work in physiological anatomy and histology (6); blow-pipe determination of minerals (3).

Third Term.—French *or* German (3); rhetoric (1); general lectures on botany (3); field work in botany (3); lectures on the comparative anatomy of the brain (2); laboratory work in zoology (4).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); psychology (2); heat (2); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3); electricity and magnetism (2); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); entomology (2); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (3); electricity and magnetism (2).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); astronomy *or* lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (2).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the junior year): laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (5); acoustics and optics (3).

Third Term.—Advanced work in botany, geology or zoology or veterinary medicine and surgery (10); acoustics and optics (3).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology.

III. TECHNICAL COURSES.

1. THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Chemistry, general (3); geometry (5); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry and mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).

Third Term.—Botany lectures (3), field work (2); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams) (3), compositæ and field work *or* practical horticulture (2); geology (3); heat (2); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology), lectures (3); vegetable histology and laboratory work *or* practical horticulture (2); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work *or* practical floriculture (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3) (Tuesday and Thursday afternoons); botany (fungi) (3), principles of horticulture (2); geology, practice (3).

Second Term.—Agriculture, lectures (5); practice (2) (Tuesday and Thursday afternoons); botany (systematic and applied, lectures) (3), laboratory work on gramineæ or special groups (2); horticulture (2).

Third Term.—Agriculture, lectures (3); practice (3) (Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (5).

2. THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing; six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Algebra (2); trigonometry (3); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting.

Third Term.—Descriptive geometry (4); draughting (2); French *or* German (5); rhetoric (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry and draughting (6); French *or* German (3); experimental mechanics (3); free-hand drawing (3).

Second Term.—Analytical geometry (5); French *or* German (3); chemistry (3); electricity and magnetism (2); draughting (2).

Third Term.—Building materials and construction (3); French *or* German (3); calculus (5); chemistry (3); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows and perspective (3); mechanics (3); heat (2); lectures on Egyptian, Greek, and Roman architecture (3); designing (4).

Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing (4).

Third Term.—Optics and acoustics (3); lectures on Gothic architecture (5); free-hand drawing (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); geology (3); designing (7).

Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).

Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

3. THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Solid geometry (5); French and German (8); rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (2); geology (3); chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); physical practice (4); chemical practice (10); organic chemistry (1), *Second Term.*—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (8); organic chemistry (1); thesis.

4. COURSES IN CIVIL ENGINEERING.

A Four Years Course, Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Monday in the term.

Second Term.—Algebra (2); spherical trigonometry (3); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).

Third Term.—Descriptive geometry (3); draughting (2); French *or* German (5); rhetoric and composition (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); descriptive geometry (4); French *or* German (3); experimental mechanics (3); draughting of original problems (2).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2); tinting and shading (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering and sketching (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); geology (3); shades, shaddows and perspective (3); heat (2); topographical mapping and sketching (2).

Second Term.—Advanced geology (3); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); architecture (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); geodesy (5); stone cutting, original problems and draughting (5); metallurgy (2).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to *write* memoirs upon subjects selected by themselves before the close of the spring term. During the last two years of the course they will be required to embody in their reports, reviews or memoirs of original investigations.

A FIVE YEARS COURSE.

Leading to the Degree of Civil Engineer.

The first and second years the same as in the preceding course. The studies in *italics* are introduced chiefly from the Course in Science and Letters, those in SMALL CAPITALS are new and of a technical character.

THIRD YEAR.

First Term.—Calculus (5); *Roman history* (5), *or physiology* (3), *and modern languages* (2); heat (2); topographical mapping (2); *essays and English literature* (2).

Second Term.—*Philosophy of history* (3); *history of the Roman empire* (5); *or, zoology* (3); *modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1); mechanics (5); acoustics and optics (3); structural details (2).

Third Term.—Mechanics (5); railroad surveying (5); acoustics and optics (3); *mediæval history* (5); *or, laboratory work* (3); *and modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1).

FOURTH YEAR.

First Term.—Geology (3); mechanics (5); Egyptian, Greek, and Roman architecture (3); shades, shadows and perspective (3); civil engineering (2); *American history* (2); *or, general literature and oratory* (3).

Second Term.—Geology (3); mechanics (5); *American history* (2); *or, Romanesque architecture* (3); *or, modern languages* (2); *political economy* (2); *general literature and oratory* (3).

Third Term.—Civil engineering (3); *logic* (3); *or, modern languages* (3); *or, general literature and oratory* (3); *or, Gothic architecture* (3); engineering economy (2); bridge construction (5); colored topography (3); two weeks hydrographic practice (3).

FIFTH YEAR.

First Term.—Spherical and practical astronomy (5); *modern history* (3); stereotomy and draughting (5); SPECIAL WORK IN

PROJECTS, DESIGNS AND ESTIMATES (3); or, RENAISSANCE ARCHITECTURE (3).

Second Term.—Geodesy (5); stone cutting (5); metallurgy (2); TECHNICAL READING IN FOREIGN LANGUAGES (2); SPECIAL WORK IN ASTRONOMY AND GEODESY (3).

Third Term.—American law and polity (5); *or, quarternions and philosophy of mathematics* (5); hydraulic motors (3); *historical reading* (2); hydrography (3); THE STEAM-ENGINE (2); original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

5. THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); freehand drawing and shop practice (5).

Second Term.—Solid geometry (5); French *or* German (5); freehand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3),

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); shades, shadows and perspective (3); heat (2); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

IV. SHORTER COURSES.—Leading to no Degree.

1. A Three Years Course in Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); chemistry, agricultural (5); chemical practice (3); drawing, freehand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); geometry (5.

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

Third or Junior year same as the fourth year of the four years course.

2. A Two Years Course in Chemistry and Physiology.

Requirements for admission the same as in the Natural History Course, except the year of French or German.

FIRST YEAR.

First Term.—French (5); physiology (3); psychology (2); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2); six lectures on hygiene.

Second Term.—French (5); zoology (3); chemistry, lectures (3); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2).

Third Term.—French (5); general botany, lectures (3); botanical laboratory practice (2); lectures on chemistry (3); medical chemistry, laboratory practice (4); rhetoric and composition (2).

SECOND YEAR.

First Term.—German (5); organic chemistry (2); heat (2);

anatomy and physiology of domesticated animals (5); laboratory practice in anatomy (3); five lectures on medical entomology.

Second Term.—German (5); vegetable physiology, or systematic and applied botany (3); electricity and magnetism (2); veterinary medicine (5); laboratory practice in physiological anatomy and histology (3); laboratory practice in vegetable physiology (2).

Third Term.—Scientific German (3); comparative anatomy of the brain (2); electricity and magnetism (2); veterinary medicine and surgery (5); laboratory practice in physiological anatomy (5).

As the lectures on heat, and those on electricity and magnetism are given only once in two years, the students will take the exercises in rhetoric and composition in year when the lectures on heat and electricity are not given.

On the completion of the course a certificate to that effect will be given the student, signed by the President and the Professor in charge of the Department of Physiology.

3. A TWO YEARS COURSE IN HISTORY AND POLITICAL SCIENCE.

Requirements for admission the same as for Optional Students, with the addition of Latin Grammar and four Books of Cæsar.

FIRST YEAR.

First Term.—Roman history (5); psychology (2); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5); six lectures on hygiene beginning the first Monday in the term.

Second Term.—History of the Roman Empire (5); moral philosophy (2) rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

Third Term.—Mediæval history (5); logic (3); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

SECOND YEAR.

First Term.—Modern history (3); American history (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Third Term.—American law (5); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

On the completion of the course the student will have a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{8}{3}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{10}{31}$, and $\frac{1}{3}$.

Simplify $$\frac{1}{1+\frac{2}{3\frac{4}{5}}}.$$

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.1\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for $1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, $250; Dec. 5, 1876, $400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argentine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*, *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.

16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?

17. State some of the uses of *it*.

18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.

19. What is the objective or factitive predicate?

20. Write out correctly the following sentences:

(*a*) One fine afternoon everybody was on deck amusing themselves as they can.

(*b*) Whom but he was true to me.

(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.

(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.

(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.

(*f*) Man could now travel further in an hour than he had previously in a day.

(*g*) Six month's interest are due.

(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.

(*i*) Nothing need to be said so firmly and nothing oftener than this.

(*k*) How will we know which is the greatest of the two?

21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.

22. Write a sentence containing an adjective clause, drawing a line under the clause.

23. Write an interrogative sentence, and parse it.

24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.

2. To draw a common tangent to two given circles; and demonstrate.

3. Two triangles are similar, if their homologous sides be proportional.

4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.

5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to find the surfaces [or the perimeters] of the regular inscribed and circumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

[*At least five of the following questions will be asked.*]

1. Make an outline diagram of the body, excluding head and limbs, and locate within it the following organs: Stomach, heart, liver, lungs, spleen, kidneys, intestine, diaphragm.
2. Name the chemical elements of the body, stating which are gases.
3. What first happens to milk in the stomach?
4. Enumerate the digestive fluids, stating which is acid.
5. State all the uses of the stomach.
6. What is the object of digestion?
7. Give a diagram of the right side of the heart.
8. Of the left side.
9. What is the heart composed of?
10. What are the differences between the air inspired, and the air expired.
11. Give some familiar examples of acids.
12. Give some familiar examples of alkalies.
13. Describe the movements of a frog's heart while beating. (The frog is supposed to have been etherized, or killed by cutting the spinal cord just behind the head.)
14. Which way does blood flow in the arteries of the arm? Which way in the veins of the arm? How do you know?
15. Explain the pulse.
16. What changes in the form of the body occur during inspiration? What during expiration?
17. State the average number of your respirations per minute when sitting still; while standing; while lying down. State the same for the pulse.
18. What is the pupil of the eye?
19. What change of the pupil occurs when one comes from a dark into a lighter room?
20. Do the ribs usually move in respiration while lying down?
21. How many teeth has a child four or five years old, and what are they called?
22. How many teeth has a youth of fifteen?
23. How many has a grown person? Name the different kinds of teeth.
24. Name the uses of the tongue.
25. Name the uses of the lips and cheeks.
26. What happens in the throat when you swallow?
27. What is the difference between walking and running?

28. What is the peculiar property of the muscular tissue (the red flesh or lean meat)?

29. Make an outline diagram of a frog's brain. (Kill the frog, or toad, with chloroform, and remove the top of the head between the eyes with a penknife.

30. Enumerate the principal parts of the central nervous system. (They are the spinal cord, medulla oblongata, cerebellum, optic lobes, thalami, hemispheres, and olfactory lobes.)

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

simplify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4x^4+1+3x^3$ by $-2x+3+2x^2$, finding the quotient to 3 terms, the remainder, and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a positive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{3}{0}$? Of $\frac{0}{3}$, and why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is now half full, *n* gallons of water flow per minute, and 10 gallons flow out. How soon will the cistern be empty? Interpret your result when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always divisible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $5x+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your result.

(*c*). Find how far you must ride at the rate of *a* miles an hour, and walk back at the rate of *b* miles an hour, to be gone *c* hours.

6 (*a*). Reduce the following radicals to their simplest form, and add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify

$$\frac{3^{-\frac{1}{3}}\,a^{\frac{4}{9}}}{3^{\frac{2}{3}}\,a^{-\frac{5}{9}}}(2b)^0;\text{ also, }\left(5^{\frac{2}{3}}\right)^{\frac{3}{4}}.$$

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{-\frac{n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{-\frac{n}{2}}\right)$.

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(*b*). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(c). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}$.

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

1. Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.

"Es mögen nun etwa acht Tage her sein, da ritt ich in die freie Reichsstadt ein. welche dort jenseit des Forstes gelegen ist. Bald darauf gab es darin ein schönes Turnieren und Ringelrennen, und ich schonte meinen Gaul und meine Lanze nicht. Als ich nun einmal an den Schranken still halte, um von der lustigen Arbeit zu rasten, und den Helm an einen meiner Knappen zurück reiche, fällt mir ein wunderschönes Frauenbild in die Augen, das im allerherrlichsten Schmuck auf einem der Altane stand und zusah. Ich fragte meinen Nachbar, und erfuhr, die reizende Jungfrau heisse Bertalda, und sei die Pflegetochter eines der mächtigen Herzoge, die in dieser Gegend wohnen. Ich merkte dass sie auch mich ansah. und—wie es nun bei uns jungen Rittern zu kommen pflegt—hatte ich erst brav geritten, so ging es nun noch ganz anders los. Den Abend beim Tanze war ich Bertalda's Gefährte, und das blieb so alle die Tage des Festes hindurch."

2. Parse the following nouns, writing the genitive singular and nominative plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* (3), *Arbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

3. Parse fully the following verbs, giving the principal parts, rule for the mood, tense, and position of each: *mögen* (1), *ritt* (1), *gelegen ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisze* (10).

II.

1. Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dass* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc, quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum, sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione, voluntatis, concursare, for-*

tuna. Explain the subjunctives *sit, cupiat, velint.* Declіne *nemo, vestrum, operis, quaestus.* To what classes of verbs do *perhorrescat, audet,* and *concursare* belong? Give the principal parts of *cupiat, audet, coeptum est.* Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat.* Compare *bene, felix, facilis, primus, vetus.* State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris?* Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας*.

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs, are *εἶδεν, δεδέσθαι, περιρρυῆναι?*

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of *ἔχοντες, ἀνέκαυσαν, ἦλθον*. Explain the phrase *ἀθύμως ἔχοντες*: the *case* of *σίτου*.

4. *Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.*

Give the acc. sing. in all genders of *πλείους*: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. *Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε αποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.*

Give synopsis of the tense and voice to which *ἀφείς* belongs. Point out the enclitics in this passage. Explain the mood of *τολμᾷ*.

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of *θείη* and *ποσσί*. In what tense, mood, voice, and from what verbs, are *ἔγρετο* and *ἀμφέχυτο*? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τῶς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of *προσεφώνεε, μέσσῳ, ὄληαι*. In what tense, mood, voice, and from what verbs, are *ἀπεχθήρω* and *ὄληαι*?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.
2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.
3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).
4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere are 85°, 100°, and 130°. Find the area of the spherical triangle in square inches.

PLANE AND SPHERICAL TRIGONOMETRY.

[Those examined only in Plane Trigonometry omitted Questions 6, 7 and 8. Those examined in Trigonometry entire omitted Questions 1 (a) and 5.]

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Show that $\sin(180°-A)=\sin A$, and $\tan(180°-A)=-\tan A$.

2 (*a*). Trace the changes in the sign and value of $\cos A-\sin A$, as A changes from 0° to 180°.

(*b*). Find the six logarithmic functions of 243° 25′ 5″. What functions of this angle are negative?

3. Two sides of a plane triangle are 10 and 20, and the included angle is 60°. Find (*a*) the area; (*b*) the remaining side; and (*c*) the remaining angles.

4 (*a*). Prove that $\cos(A+B)=\cos A\cos B-\sin A\sin B$; and hence show that $\cos 2A=2\cos^2 A-1=1-2\sin^2 A$.

(*b*). Obtain the value of $\sin A$ in terms of $\tan A$.

(*c*). If $\tan A=2\sin A$, find the value of A.

5. In a plane triangle, given $a=584.7328$, $b=367.4001$, and $B=37°\ 42'\ 13''$, find the remaining angles and side.

6. Prove that, in a spherical triangle right-angled at C, $\sin a=\sin A\sin c$.

7. From the formula $\cos a=\cos b\cos c+\sin b\sin c\cos A$, derive the formula

$$\tan\tfrac{1}{2}A=\sqrt{\frac{\sin(s-b)\sin(s-c)}{\sin(s-a)\sin s}}.$$

8. Given $a=36°$, $b=49°\ 37'\ 34''$, $c=76°\ 14'\ 26''$, find A.

ADVANCED ALGEBRA.

1 (*a*). Demonstrate the following formula in Geometrical Progression:

$$S=\frac{a(r^n-1)}{r-1}$$

(*b*). Find the sum of the series $1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\dots$ to six terms; also, to infinity. What do you understand by the sum of an infinite series?

2. Reduce $\pi,=\frac{31416}{10000}$, to a continued fraction; and from this, find three successive approximate values of π.

3. Find the number of combinations of ten things, taken four at a time; and give the reasoning.

4. Write and demonstrate the Binomial Formula.

5. By the Method of Differences, find the 101st term of the series 1, 7, 15, 25, 37, . . ; and likewise the sum of the first 101 terms of this series.

6. Express $\frac{4x}{x^2-9}$ as the sum of two fractions whose denominators are $x+3$ and $x-3$, using the Method of Undetermined Coefficients.

7. What is meant by the logarithm of a number n in a system whose base is b? Prove that $\log n$, when the base is b, and $\log b$, when the base is n, are reciprocals of each other.

8. Prove that if r be a value of x that satisfies the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\dots+K=0,$$

then the first member is divisible by $x-r$; and conversely.

9 (*a*). Write the equation whose roots shall be 0, -2, -2, $1+\sqrt{-1}$, and $1-\sqrt{-1}$.

(*b*). What are conjugate imaginaries? Prove that if the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\dots+K=0$$

has imaginary roots, they are in pairs. [The known quantities A, B, . . . K are supposed to be real.]

10. Find a commensurable root of the equation $x^4+2x^3-x^2+35x+37=0$, then depress the degree of the equation, and find an incommensurable root to three decimals.

DEGREES AND PRIZES.

ORDER OF EXERCISES AT THE TENTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 20, 1878.

The Lord's Prayer.

1. ORATION: Inspirers and Organizers in History,
EUGENE CARY, *Dunkirk*
2. *THESIS IN AGRICULTURE: Rotation in Crops,
BENTO DE-ALMEIDA PRADO, *Itù, S. Paulo, Brazil*
3. THESIS IN NATURAL HISTORY: The Native Races of Central America, FRED BAKER, *Norwalk, Ohio*
4. *THESIS IN CIVIL ENGINEERING: Design for a Railroad Bridge, DAVID MARX, *Toledo, Ohio*
5. *THESIS IN MECHANIC ARTS: The Reynolds 8-Ton Hoisting Machine, ARTHUR FALKENAU, *New York City*
6. *ESSAY IN LITERATURE: Superstition among the Men of Letters in Ancient Rome,
RUTH PUTNAM, *New York City*
7. ESSAY: Technical Education,
ROBERT HENRY TREMAN, *Ithaca*
8. ORATION: The Elevation of Labor,
WATSON WEED, *North Rose*
9. ESSAY: Theodore Winthrop and his Writings,
HEYWOOD CONANT, *Wilmington, Del.*
10. *THESIS IN MECHANIC ARTS: The Steam-engine Indicator, FREDERIC ARTHUR HALSEY, *Unadilla*
11. *THESIS IN ARCHITECTURE: Swiss Architecture,
QUINTILIANO NERY RIBIERO, *Minos-Geraes, Brazil*
12. ORATION: The Evolution and Power of Ideas,
JOSEPH NESS, *Hoopeston, Ill.*
13. *THESIS IN CHEMISTRY: Malt Liquors and their Chemical Relations, CLAYTON CRANDALL, *Ithaca*
14. ESSAY: The Economic Conditions of Railway Location,
CORNELIUS STEPHENS THACHER, *Hopewell*

15. *THESIS IN SCANDINAVIAN LITERATURE: Tegner's Frithiof's Saga,
ARTHUR MIDDLETON REEVES, *Richmond, Ind.*
16. ORATION: Communism in America,
ARTHUR COOPER WAKELEY, *Omaha, Neb.*
17. LITERARY ESSAY: Woman in Tennyson,
CHARLES MYRON REXFORD, *Watertown*
18. *THESIS IN CIVIL ENGINEERING: English and American Iron Bridges,
FRANK EDWARD BISSELL, *South Bend, Ind.*
19. *THESIS IN MODERN LANGUAGES: The Origin of the Italian Language, JOHN WESLEY BABCOCK, *Jamestown*
20. *THESIS IN ANCIENT LITERATURE: Aristophanes and Roman Satire,
ARTHUR LUDWIG KARL VOLKMANN, Arch.B., *New York City*
21. THE WOODFORD ORATION: Individual Manhood as an Influence in History,
CHARLES WILBERFORCE AMES, *Germantown, Pa.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the Acting President.

BENEDICTION.

*Not read.

DEGREES CONFERRED IN 1878.

The following is a list of those who received degrees at the annual Commencement at the close of the tenth academic year, together with the degrees conferred and the residence of each recipient:—

FIRST DEGREES.

BACHELORS OF ARTS, (9).

JOHN WESLEY BABCOCK,	Jamestown.
DANIEL WAYLAND CADY,	Peterborough.
BESSIE BELL DE WITT,	Owego.
MARGARET HICKS,	Syracuse.
KIT MC EBRIGHT,	Akron, O.
WILLIAM LINCOLN MC KAY,	Des Moines, Ia.
CHARLES MYRON REXFORD,	Watertown.
ELIAS HORNING SELLERS,	Fentonville, Mich.
ARTHUR LUDWIG KARL VOLKMANN, Arch.B.,	New York City.

BACHELORS OF LITERATURE, (3).

CHARLES WILBERFORCE AMES,	Germantown, Pa.
RUTH PUTNAM,	New York City.
ARTHUR COOPER WAKELEY,	Omaha, Neb.

BACHELORS OF PHILOSOPHY, (2).

JACOB SCHWARTZ LEHMAIER,	New York City.
MARY ELLEN OLIVER,	Lynn, Mass.

BACHELORS OF SCIENCE, (24).

In Science and Letters, (18).

EUGENE BAKER,	Ithaca.
ALFRED HOVEY BALLARD,	Syracuse.
SAMUEL THRUSTON BALLARD,	Louisville, Ky.
PHILIP BARNARD,	Lake View, Ill.
EUGENE CARY,	Dunkirk.
HEYWOOD CONANT,	Wilmington, Del.
GEORGE PENSTON EATON,	Oxford.
CHARLES BROWN EVERSON,	Syracuse.
LIZZIE JANE GIDDINGS,	Jefferson, O.
LISETTE FRANCES JONES,	Ilion.
FRANKLIN MASON KENDALL,	Attica.
FRANK OLIVER MEEKER,	Franklin, W. T.
JOSEPH NESS,	Hoopeston, Ill.
WILLIAM BERNICE PATTIN,	Fort Plain.
WILLIAM PASSMORE PICKETT,	Litchfield, Ct.
ARTHUR MIDDLETON REEVES,	Richmond, Indiana.
HENRY JUSTIN VAN NORMAN,	Jasper.
WATSON WEED,	North Rose.

In Physical Science, (1).

FRANKLIN WESTON MANN,	Norfolk, Mass.

In Chemistry, (3)

CLAYTON CRANDALL,	Ithaca.
SAMUEL GATFIELD DEWSNAP,	Middletown.
WILLIAM KEITH,	Warsaw.

In Natural History, (2).

FRED BAKER,	Norwalk, O.
ARTHUR EUGENE BEARDSLEY,	Cayuga, Ill.

BACHELOR OF AGRICULTURE, (1).

BENTO DE ALMEIDA PRADO,	Itù, S. Paulo, Brazil.

BAGHELORS OF ARCHITECTURE, (2).

EDWARD GREEN,	Utica.
QUINTILIANO NERY RIBEIRO,	Minos-Geraes, Brazil.

BACHELORS OF CIVIL ENGINEERING, (14).

WILLARD BEAHAN,	Watkins.
FRANK EDWARD BISSELL,	South Bend, Ind.
FRANK BRUEN,	Dayton, O.
JAMES DYSON,	New Britain, Ct.
EDWARD HAYES,	Cohoes.
GEORGE MILTON JARVIS,	Canastota.
DAVID MARX,	Toledo, O.
FRANK ADAMS MAXWELL,	Clymer.
CYRUS HALL MC CORMICK,	Henderson, Ky.
THOMAS DAVIS MERRILL,	Saginaw City, Mich.
EDWARD LIVERMORE PRESTON,	Grinnell, Ia.
FRANCISCO VALDES RODRIGUEZ,	Havana, Cuba.
CORNELIUS STEPHENS THACHER,	Hopewell.
PHILIP ALBERT WELKER,	Toledo, O.

BACHELORS OF MECHANICAL ENGINEERING, (12).

JAMES MC KEE BORDEN,	Washington, D. C.
ELLWOOD BURDSALL,	Port Chester.
ARTHUR FALKENAU,	New York City.
FREDERIC ARTHUR HALSEY,	Unadilla.
FORBES HEERMANS,	Syracuse.
JOHN THOMAS HILL,	Warren, Pa.
BEN JOHNSON,	Ithaca.
WILLIAM KELLY SEAMAN,	Newburgh.
ALBERT WILLIAM SMITH,	Westmoreland.
ROBERT HENRY TREMAN,	Ithaca.
AUGUSTO CEZAR DE VASCONCELLOS,	Rio de Janeiro, Brazil.
WALLACE JAY WILCOX,	Ithaca.

SECOND DEGREES.

MASTER OF ARTS, (1).

MARY H. LADD, A.B.,	Cornell.

CIVIL ENGINEERS, (2).

IRVING P. CHURCH, B.C.E.,	Cornell.
CHARLES W. RAYMOND, B.C.E.,	Cornell.

LICENTIATES.

IN PHYSIOLOGICAL ANATOMY, (1).

WILLIAM S. GOTTHEIL, New York City.

IN MINERALOGY AND ASSAYING, (1).

FRANCIS M. WILSON, Ithaca.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the tenth academic year—1877–8:

1. Woodford prize—a gold medal—Charles W. Ames.
2. First Horace K. White prize in Veterinary Science, twenty dollars, John H. Weinmann.
3. Second Horace K. White prize in Veterinary Science, ten dollars, W. N. D. Bird.
4. Prizes of the Early English Text society:

First prize, George L. Burr.
Second prize, Harriet Heyl.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1878–9:

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Public Spirit in the Scholar.
2. Hamlet and Orestes.
3. Toussaint L'Ouverture and Napoleon Bonaparte.
4. Popular Delusions.
5. The Debt of Great Men to Associates and Compeers.

6. The Monk Augustin in the Sixth Century and Livingstone in the Nineteenth.
7. Sentimental and Scientific Philanthropy.
8. "The Good and Noble Masters" whom a man is to please.

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

EARLY ENGLISH TEXT AND SHAKSPERE SOCIETY PRIZES.

These prizes consist of the publications of the two societies above named respectively. The number of prizes is not limited, but depends on the number of students in the Special English Literature classes, and the award of the prizes is based on the general work done by the students in the department.

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an *auditing committee*.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1878–9.

President—E. F. ROBB, '70.
Vice-Presidents—C. F. HENDRYX, '69; C. J. POWERS, '70; A. N. FITCH, '71; G. A. ISELIN, '72; R. BACON, '73; H. L. FAIRCHILD, '74; J. T. NEWMAN, '75; C. T. BREWER, '76; C. S. COBB, '77.
Recording Secretary and Treasurer—W. R. LAZENBY, '74.
Corresponding Secretary—M. VAN CLEEF, '74.
Executive Committee—M. VAN CLEEF, and W. R. LAZENBY, *ex officio*, and W. H. SMITH, E. A. WAGENER, H. W. FOSTER.
Auditing Committee—G. B. TURNER, R. G. H. SPEED, and J. S. COON.
Orator—G. H. FITCH, '75; Alternate, H. V. L. JONES.
Poet—W. R. DUDLEY, '74; Alternate, F. D. CARPENTER.
Essayist—M. H. LADD, '75; Alternate, Mrs. R. H. WILES.

TRUSTEE ELECTED.

HON. CHARLES C. DWIGHT.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph. D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B.
C. J. Powers, B. S,
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. A.M.,'76).
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E.Copeland, Ph.B.,(M.S., '75).
C. L. Crandall, (C.E.,'76).
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73).
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E.,'74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
*H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, (D.V.M.,'76).
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
*C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74)

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S. (C.E.,'76).
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
*E.T.Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell, B. S.
L. Falkeneau, B.C.E. (C.E.,'77).
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
*K. Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

H. D. Stevens, B. S.
G. A. Tilley, B. C. E.
W. Tinning, B. S.
J. H. Tompkins, B. C. E.
G. B. Turner, B. S.
M. W. Van Auken, A. B.
C. F. Wheelock, B. S.
T. S. White, B. C. E.
T. Worthington, Ph. B.

GRADUATED IN 1874. [64].

F. B. Alexander, B. C. E.
Geo. Berry, Arch. B. (Arch.,'76)
N. W. Cady, Ph. B.
C. W. Candee, B. S.
J. D. Case, B. S.
J. F. Cluck, A. B.
J. H. Comstock, B. S.
F. W. Cooper, Arch. B.
O. H. P. Cornell, C. E.
J. A. Dobroluboff, B. C. E.
W. R. Dudley, B. S. (M.S.,'76)
H. L. R. Fairchild, B. S.
W. R. Fitch, B. C. E.
S. P. Fleming, A. B.
W. H. Flint, A. B.
R. B. Foster, B. C. E. (C.E.,'77)
L. M. Fulton, B. S.
Wallace Green, B. C. E.
H. M. Gillett, B. S.
T. Hampson, Lit. B.
J. T. Hay, B. S.
B. A. Hayes, Lit. B.
L. T. Henderson, Ph. B.
H. M. Hibbard, B. C. E.
H. L. House, A. B.
J. T. Hurd, B. S.
W. H. Janney, B. C. E.
E. F. P. Jordao, B. C. E.
W. A. Kellerman, B. S.
H. M. Kennedy, Lit. B.
B. W. Law, Arch. B.
C. H. Lay, B. C. E.
W. R. Lazenby, Agr. B.
H. G. Northrup, B. C. E.
J. H. Pierce, B. S.
E. M. Pitts, B. S., (M. S '75).
C. A. Preston, B. S.
C. H. Ramsay, B. S.
E. O. Randall, Ph. B.
W. M. J. Rice, Arch. B.
H. B. Robinson, B. C. E.
B. E. Shear, Arch. B.
G. S. Sheppard, B. S.
W. M. Smith, B. S.
W. N. Smith, B. M. E.
C. W. Soulby, B. S.
J. H. Southard, B. S.
A. C. Standart, B. S.
J. L. Stone, Agr. B.
W. Swaty, B. S.
W. P. Thompson, B. S.
L. P. Tier, B. C. E.
S. E. Todd, Arch. B.
F. C. Tomlinson, B. C. E.
G. B. Upham, B. S.
J. D. Upham, B. S.
M. Van Cleef, B. S.
G. R. Van De Water, B. S.
C. W. Wasson, B. C. E.
F. W. Warthorst, B. C. E.
R. H. Wiles, B. S.
G. T. Winston, Lit. B.
C. C. Wood, B. S.
F. C. Wood, B. S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph. B.
A. A. Beattie, B. M. E.
H. P. Bellows, B. S.
E. T. Betts, B. S.
A. R. Bradford, B. S.
A. W. Bulkley, Arch. B.
S. J. Bunting, B. M. E.
C. F. Burt, B. S.
S. W. Carpenter, Ph. B.
I. N. Cook, B. C. E.
E. Corson, B. S.
V. L. Davey, A. B.
J. W. Dean, B. S.
O. W. Ferguson, B. C. E.
G. H. Fitch, B. S.
E. L. B. Gardiner, B. M. E.
E. George, B. C. E.
A. R. Gillis, B. M. E.
A. C. Green, B. C. E.

C. S. Harmon, B. S.
O. Harris, B. S.
F. Hatch, A. B.
F. H. Hiscock, A. B.
D. R. Horton, B. S.
I. E. Hutton, Arch. B.
E. Jackson, B. S.
C. C. King, Arch. B.
H. B. Knight, A. B.
M. H. Ladd, A. B.
M. D. Makepeace, B, C. E.
G. S. Moler, B. M. E.
J. T. Newman, Ph. B.
E. L. Nichols, B. S.
P. H. Perkins, B. C. E.
E. D. Preston, B. C. E.
E. J. Preston, B. S.
H. H. Roberts, Ph. B.
E. K. Rossiter, Arch. B.
H. W. Sackett, A. B.
A. F. Shaw, B. S.
F. W. Simonds, B. S. (M. S., '76).
F. P. Smith, B. S.
F. P. Stevens, B. S.
W. M. Sturges, Agr. B.
G. Tatnall, B. C. E.
J. J. Thomas, A. B. (A. M., '76).
G. R. Thompson, B. S,
W. J. Thompson, B. S.
D. J. Tomkins, Ph. B.
V. S. Walsh. B. S.
F. P. Wheeler, B. S.
J. Worthington, A. B.

GRADUATED IN 1876. [65]

J. M. Ashley, B. S.
C. P. Aylen, B. C. E.
C. Barclay, B. S.
Carlos P. de Barros, B. C. E.
W. J. Berry, A. B.
G. Boardman, B. M. E.
C. T. Brewer, Ph. B.
J. T. Brown, B. M. E.
F. de A. V. Bueno, B. C. E.
J. K. Cady, Arch. B.
C. F. Carpenter, B. M. E.
E. F. Church, B. M. E.
M. R. Conable, B. C. E.
C. B. Coon, B. S.
S. H. Coon, A. B.
E. L. Crandall, B. S.
S. S. Eddy, B. S.
*A. F. Eidlitz, B. C. E.
C. H. Esty, A. B.
W. F. Farmer, B. C. E.
D. F. Flannery, B. S.
C. W. Foote, A. B., M. A., (Ph. D, '77.)
A. W. Foster, A. B., M. A.
E. Frayer, A. B. (A. M., '77).
M. M. Garver, B. S.
H. McC. Hadley, Arch. B.
F. E. Heath, B. S.
A. Z. Kent, B. M. E.
W. H. Kent, B. S.
F. Looney, B. S.
A. E. Maltby, B. C. E.
W. G. McDowell, A. B
J. C. McMullen, B. C.
R. L. Moore, B. S.
F. W. Noyes, Ph. B.
L. B. Palmer, B. S.
W. H. Parker, Arch. B.
C. R. Parkhurst, B. S.
J. Parmelee, B. S.
C. W. Raymond, B. C. E.
H. J. Rice, B. S.
W. K. Roy. B. S.
H. A. Rueppele, B. S.
H. Russel, A. B.
C. F. Saunders, Arch. B.
H. B. Seeley, Arch. B.
H. H. Seymour, B. S.
T. Stanton, A. B. (A. M., '77).
J. H. Stubbs, B. C. E.
J. W. Sturdevant, B. S.
S. P. Sturges, A. B.
W. P. Sturges, B. S.
J. B. Tarleton, Arch. B.
F. E. Taylor, B. M. E.
H. Terry, B. S.
E. D. Thompson, B. C. E.
H. C. Tilden, Lit. B.
C. A. Van Velzer, B. S.
E. A. Wagner, B. S.
C. E. Washburne, Ph. B.
C. B. Wheelock, B. C. E.

C. H. Willmarth, Agr. B. (M. S., '77).
C. P. Woodruff, B. S.
R. Yatabe, B. S.
F. O. Young, B. S.

GRADUATED IN 1877.

W. C. Ames, B. C. E.
J. Aylen, B. C. E.
A. F. Balch, Arch. B.
C. M. Bean, Agr. B.
J. B. Beatty, B. S.
W. E. Bramhall, B. C. E.
Ida Bruce, A. B.
A. S. Carman, B. S.
P. D. Clark, Ph. B.
C. S. Cobb, B. S.
C. M. Cooper, B. S.
J. S. Coon, B. M. E.
F. D. Crim, B. S.
W. L. Deming, Arch. B.
W. E. Dennis, B. S.
W. R. Dobbyn, Lit. B.
L. Eidlitz, B. M. E.
H. W. Foster, A. B.
A. E. Frota, B. C. E.
S. H. Gage, B. S.
W. Gentleman, B. S.
W. S. Gifford, B. S.
G. W. Gillett. Ph. B.
B. H. Grove, A. B.
M. E. Haviland, B. S.
F. B. Hine, B. S.
L. O. Howard, B. S.
D. W. King, Arch. B.
W. E. Lape, B. M. E.
A. J. Loos, B. S.
W. E. Lucas, Ph. B.
D. J. Macpherson, B. C. E.
C. B. Mandeville, B. S.
L. M. Mann, B. C. E.
A. B. McNairy, B. M. E.
T. L. Mead, B. C. E.
J. S. Milford, B. S.
D. C. Moraes, B. C. E.
C. T. Mould, Arch. B.
I H. Myers, B. S.
E. O'Niel, Ph. B.
J. N. Ostrom, B. C. E.
F. Outerbridge, B. M. E.
E. H. Palmer, B. S.
F. Patrick, Ph. B.
T. B. Peck, Arch. B.
F. M. Pennock, Agr. B.
H. Russel, (A. B.) Arch. B.
F. V. D. Sanford, B. S.
E. J. Sellew, A. B.
E. D. Sherman, B. S.
W. J. Sherman, B. C. E.
M. J. Sinton, B. S.
E. R. Smith, B. C. E.
S. M'K. Smith, Ph. B.
J. C. H. Stevenson, Ph. B.
H. Thomas, B. C. E.
M. C. Thomas, A. B.
W. B. Throop, B. C. E.
A. S. Tibbets, B. C. E.
H. H. Tyndale, B. S.
E. M. Van Dusen, Lit. B.
D. F. Van Vleet, B. S.
J. Viegas-Munis, B. C. E.
A. L. K. Volkman, Arch. B.
E. L. Ware, B. M. E.
J. S. Waterman, B. M. E.
F. P. Weeks, B. S.
H. S. White, B. S.
C. F. Wilson, Ph. B.

GRADUATED IN 1878.

C. W. Ames, Lit. B.
J. W. Babcock, A. M.
E. Baker, B. S.
F. Baker, B. S.
A. H. Ballard, B. S.
S. T. Ballard, B. S.
P. Barnard, B. S.
W. Beahan, B. C. E.
A. E. Beardsley, B. S.
F. E. Bissell, B. C. E.
J. M. Borden, B. M. E.
F. Bruen, B. C. E.
E. Burdsall, B. M. E.
D. W. Cady, A. B.
E. Carey, B. S.
H. Conant, B. S.
C. Crandall, B. S.

S. G. Dewsnap, B. S.
B. B. DeWitt, A. B.
J. Dyson, B. C, E.
G. P. Eaton, B. S.
C. B. Everson, B. S.
A. Falkenau, B. C. E.
L. J. Giddings, B. S.
E. Green, Arch. B.
F. A. Halsey, B. M. E.
E. Hayes, B. C. E.
F. Heermans, B. M. E.
M. Hicks, A. B.
J. T. Hill, B. M. E.
G. M. Jarvis, B. C. E.
B. Johnson, B. M. E.
L. F. Jones, B. S.
W. Keith, B. S.
F. M. Kendall, B. S.
J. S. Lehmaier, Ph. B.
F. W. Mann, B. S.
D. Marx, B. C. E.
F. A. Maxwell, B. C. E.
C. H. McCormick, B. C. E.
K. McEbright, A. B.
W. L. McKay. A. B.
F. O. Meeker, B. S.
T. D. Merrill, B. C. E.
J. Ness, B. S.
M. E. Oliver, Ph. B.
W. B. Pattin, B. S.
W. P. Pickett, B. S.
B. de A. Prado, Agr. B.
E. L. Preston, B. C, E.
R. Putnam, Lit. B.
A. M. Reeves, B. S.
C. M. Rexford, A. B.
Q. N. Ribiero, Arch. B.
F. V. Rodriguez, B. C. E.
W. K. Seaman, B. M. E.
E. H. Sellers, A. B.
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PREPARATORY SCHOOL.

The Calendar of the **Preparatory School** *conducted by Professors* MacKoon *and* Wait *is the same as that of the Cornell University, with one term additional beginning in June, on the Wednesday following the annual Commencement of the University.*

Thorough instruction is given, to classes, or to single pupils, in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the departments of the University. Inquiries may be addressed to either of the undersigned, Ithaca, N. Y.

B. P. MacKoon. **L. A. Wait.**

THE

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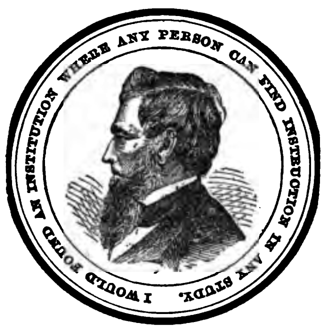
1879-80



ITHACA
PUBLISHED BY THE UNIVERSITY
1880

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MEANS AND FACILITIES FOR EDUCATION.

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THE CALENDAR.

1879	**Sept. 16**	**Fall Term.**
September 16	Tuesday	Entrance Examinations.
September 17	Wednesday	Entrance Examinations continued.
September 18	Thursday	REGISTRATION for the Term.
September 19	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 15	Monday	Term Examinations begin.
December 19	Friday	Term ends.
1880	**Jan. 6**	**Winter Term.**
January 6	Tuesday	Entrance Examinations.
January 7	Wednesday	Entrance Examinations continued.
January 8	Thursday	REGISTRATION for the Term.
January 9	Friday	Instruction begins.
January 11	Sunday	FOUNDER'S DAY.
February 22	Sunday	WASHINGTON'S BIRTHDAY.
March 5	Friday	Woodford Prize Competition.
March 22	Monday	Term Examinations begin.
March 26	Friday	Term ends.

1880	April 3		Spring Term.
April	3	Saturday	REGISTRATION for the Term.
April	5	Monday	Instruction begins.
May	17	Monday	Commencement Essays handed in.
May	30	Sunday	DECORATION DAY.
May	31	Monday	Senior Examinations begin.
June	1	Tuesday	Examinations for Second Degrees.
June	7	Monday	Term Examinations begin.
June	12	Saturday	Term Examinations end.
June	14	Monday	Entrance Examinations begin at the University.
June	15	Tuesday	Entrance Examinations begin at Chicago, Cleveland and Boston.
June	15	Tuesday	Class Day.
June	16	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	17	Thursday	ANNUAL COMMENCEMENT.
1880	Sept. 14		Fall Term.
September	14	Tuesday	Entrance Examinatons.
September	15	Wednesday	Entrance Examinations continued.
September	16	Thursday	REGISTRATION for the Term.
September	17	Friday	Instruction begins.

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Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Pelt, Gertrude Wyckoff,	Trumansburg,	*Science and Letters*
Vaughan, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Wick, Richard Brown,	Pittsburgh, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wilson, Frank Thomas,	Corry, Pa.,	*Science and Letters*
Wilson, Josiah Dustin,	N. Haverhill, N. H.,	*Optional*
Winegar, Harry Philips,	Sacramento, Cal.,	*Arts, Opt.*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy,	*Arts*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Adams, John Davis,	Plainville, N. J.,	*Literature*
Ayeres, Mary Frances,	Ithaca,	*Literature*
Baker, Clarence Albert,	Yaphank,	*Medical Preparatory*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Ballard, Eugene Forrest,	Black Hawk, Col.,	*Hist. & Polit. Sc.*
Bass, Charles Edgar,	Smyrna,	*Optional*
Beebe, George,	Penn Yan,	*Science and Letters*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown, Ellen Coit,	Ithaca,	*Science and Letters*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	New York City,	*Agriculture*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carmody, Thomas,	Bellona,	*Science and Letters*
Carpenter, Calvin,	Troy,	*Science and Letters*
Carson, William,	St. Paul, Minn.,	*Science and Letters*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chandler, Frances Harden,	Ithaca,	*Optional*
Chester, Frederic Dixon,	St. Louis, Mo.,	*Science and Letters*
Coe, Alfred Byron,	Oswego,	*Science*
Cole, Emma Jane,	Lowell, Mich.,	*Optional*
Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Cowles, Albert Hutchingson,	Cleveland, O.,	*Science and Letters*
Crider, Rollin Frederick,	Greenville, O.,	*Science and Letters*
Curtis, Ida Maynard,	Boston, Mass.,	*Science and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Desbecker, Daniel,	Buffalo,	*Chemistry, Special*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Ely, Prescott,	Marquette, Mich.,	*Hist. and Pol. Sc.*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fay, Lewis George,	Burlington,	*Arts, Opt.*
Ferguson, Oakley Walter,	Troy,	*Engineering*

Fiske, Ferdinand Comstock,	Maquoketa, Ia.,	*Architecture*
Foucar, Edward Louis,	Boston, Mass.,	*Mechanic Arts*
Fowler, Mary,	Governeur,	*Science and Letters*
Gardiner, William Frederick,	Fort Covington,	*Medical Preparatory*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*
Gritman, William Ball,	Carbondale, Pa.,	*Hist. & Pol. Science*
Hamill, Vincent Gilbert,	Phœnix,	*Medical Preparatory*
Harding, William Elias,	Bethany,	*Agriculture*
Hatch, Arthur Gillespie,	Perry,	*Philosophy*
Heermans, Thaddeus Willson,	Chicago, Ill.,	*Mechanic Arts*
Heron, Nannie Jacobs,	Danville, Ky.,	*Arts*
Hine, Charles Leman,	Washington, D. C.,	*Hist. & Pol. Sc.*
Hiscock, Albert King,	Syracuse,	*Arts*
Holman, Julian,	Bolton, Mass.,	*Agriculture*
Holton, Frederick Arthur,	Washington, D. C.,	*Med. Preparatory*
Horr, Norton Townshend,	Wellington, O.,	*Science and Letters*
Horr, Rollin Cortland,	Wellington, O.,	*Science and Letters*
Hutchinson, Douglas Welton,	Chicago, Ill.,	*Science and Letters*
Jones, George Augustus,	Addison, Ia.,	*Agriculture*
Jones, Hervey Brayton,	Westernville,	*Optional*
Kenney, Eudorus Catline,	Truxton,	*Mathematics*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Krüsi, Hermann,	Oswego,	*Engineering*
Leary, Frank,	Ithaca,	*Science and Letters*
Lemann, Charles Henry,	Bothampton, Eng.,	*Agriculture, Special*
Luckey, Frank Ranney,	Poughkeepsie,	*Science and Letters*
Lukes, Currie Wilson,	Racine, Wis.,	*Hist. and Polit. Science*
Lyon, John,	Schuylerville,	*Hist. and Polit. Science*
McClelland, Robert Watson,	Pittsburgh, Pa.,	*Philosophy, Opt*
McDermid, Andrew Jackson,	Marshall, Mich.,	*Agriculture*
Mott, Seward,	Bouckville,	*Natural History*
Oatley, Eugene Lyman,	Utica,	*Medical Preparatory*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*

Pitcher, Charles Daniel,	Owego,	*Arts*
Potter, Bina Abigal,	Ithaca,	*Optional*
Pratt, Ransom,	Corning,	*Science and Letters*
Purdy, Markwell Seward,	Corning,	*Arts*
Putnam, Mary Chastina,	Ellington,	*Literature*
Raekemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walter Glazier,	Minetto,	*Science and Letters*
Reading, William Barton,	West Falls,	*Hist. and Polit. Science*
Reed, Jared Ackerson,	Ontario,	*Arts, Opt.*
Robie, Harry Adams,	Marathon,	*Mechanic Arts*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Root, Daniel Bayard,	Port Byron,	*Arts*
Rosen, George,	Louisville, Ky.,	*Agriculture*
Ruger, Crawford Proser,	Syracuse,	*Arts, Opt.*
Sazé, Hidesabro,	Fukushima, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Natural History*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Sheldon, Frances Elizabeth,	Oswego,	*Optional*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Science and Letters*
Shorter, Thomas Jaye,	Aurora,	*Optional*
Sibley, Lucy Culver,	Cuba,	*Optional*
Smith, Henry Willis,	Woodbourne,	*Philosophy, Opt.*
Smith, Hermon Woodworth,	Trumansburg,	*Science and Letters*
Smith, Isaac Parshall,	Ithaca,	*Arts*
Smith, Joseph Lesley,	Canajoharie,	*Science and Letters*
Sommers, Frederick Skelding,	Ithaca,	*Optional*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Stevens, Charles Henry,	Homer,	*Arts, Opt.*
Streeter, Howard Malcolm,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Mechanic Arts*
Thompson, James Calvin,	Pittsburgh, Pa.,	*Medical Preparatory*
Thompson, Madeline Sylvester,	Passaic, N. J.,	*Science and Letters*
Trumbull, William,	Sandy Hill,	*Engineering*
Tucker, John Thomas,	Varna,	*Agriculture*

er, Leonidas Harvey,	Decatur, Ill.,	*Optional*
ll, James Fred,	Corning,	*Philosophy*
?elt, Elizabeth Vredenburg,	Trumansburg,	*Science and Letters*
Rensselaer, John,	Ithaca,	*Arts, Opt.*
John Cassan,	Norwich,	*Engineering*
o, Gerald,	Scotland, Ct.,	*Agriculture*
nbeck, George,	Watkins,	*Natural History, Special*
ter, John Guerdon,	Bath,	*Natural History*
x, Asa Stearns,	East Minneapolis, Minn.,	*Sc. & Let.*
nson, Marion,	Syracuse,	*Arts*
ms, Isaac,	Niagara, Canada,	*Agriculture*
n, Dora Frank,	Ithaca,	*Science and Letters*
ard, James Allen,	Elma,	*Optional*
lruff, Edwin Hamlin,	Ithaca,	*Science and Letters*
it, George Herdman,	Buffalo,	*Arts*
, Everett,	Lawrence, Mass.,	*Arts, Opt.*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

r, Asa Alling,	Bangal,	*Science and Letters*
rson, Charles Henry,	Griggsville, Ill.,	*Optional*
is, Elon Oscar,	Watertown,	*Science*
r, Charles Irving,	Auburn,	*Science and Letters*
r, James Carrington,	Auburn,	*Science and Letters*
i, Philip Wheelock,	Villa Ridge, Ill.,	*Philosophy*
, Josephine,	Syracuse,	*Science and Letters*
ws, Elmer Ellsworth,	Albany,	*Mechanic Arts*
John Charles,	Laurel, Ia.,	*Science*
, Herman Michael,	Trumansburg,	*Arts*
e, Helen Maria,	Keene, N. H.,	*Optional*

Blachstein, Arthur,	New York City,	*Arts*
Blue, Frank,	Jacksonville,	*Arts*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Oil City, Pa.,	*Literature*
Boyer, Jerome Webster,	Freeport, Ill.,	*Agriculture*
Brainard, Austin,	Higganum, Ct.,	*Science and Letters*
Buckland, Benjamin Isaac Coman,	Port Byron,	*Science and Letters*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*
Burpee, George Herbert,	Saquoit,	*Mechanic Arts*
Cahn, Benjamin Robert,	Chicago, Ill.,	*Science and Letters*
Cain, James Laurence,	Flushing,	*Science and Letters*
Carr, Frank Headley,	Cleveland, O.,	*Science and Letters*
Chase, Charles Curry,	Schenevus,	*Literature, Opt.*
Chittenden, Hiram Martin,	Yorkshire Centre,	*Optional*
Cobb, William Howard,	Andover,	*Agriculture*
Crooker, Edward Henry,	Minneapolis, Minn.,	*Arts, Opt.*
Curtis, Charles Locke,	Newfield,	*Arts, Opt.*
Cushing, Edward Fitch,	Cleveland, O.,	*Philosophy*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dietz, John Fanning,	Schoharie,	*Science and Letters*
Dix, John Alden,	Glen's Falls,	*Optional*
Dowling, Eunice,	Bradford,	*Arts, Opt.*
Duryea, Edwin,	Craigville,	*Engineering*
Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moses,	Ithaca,	*Arts, Opt.*
Ehrman, Harry,	Decatnr, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Failing, Milton,	Rexville,	*Science and Letters*
Fairbanks, Leland,	New York City,	*Mechanic Arts*
Finch, Robert Brooks,	Ithaca,	*Science and Letters*
Fraser, James,	Johnstown,	*Science and Letters*
Freeman, Walter Jackson,	Philadelphia, Pa.,	*Arts, Opt.*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*

e, Linnie,	Varick,	*Literature*
', Frank Ozro,	Danville, Ind.,	*Arts, Opt.*
, Ella Marie,	Schoharie,	*Optional*
ıan, Edward Balcom,	Painted Post,	*Optional*
ın, Harry Natt,	Elmira,	*Agriculture*
ray, Edward Norton,	Indianapolis, Ind.,	*Science and Letters*
Joseph Chase,	Clifton, O.,	*Architecture*
, Azel Clarence,	South Butler,	*Science and Letters*
'd, William Turner,	New Orleans, La.,	*Science and Letters*
hries, John Henry,	Syracuse,	*Science and Letters*
oll, George Talcott,	Cleveland, O.,	*Mechanic Arts*
, Townsend Herbert,	Ithaca,	*Architecture*
ın, Edward Newton,	Reading, Pa.,	*Arts*
Newton Lewis,	West Albany,	*Mechanic Arts, Opt.*
Charles Wallace,	Albany,	*Mechanic Arts*
Milton Royce,	Mongaup Valley,	*Science*
Thomas Francis,	Norwich,	*Mechanic Arts*
rell, Harry Edgar,	Monongahela City, Pa.,	*Mechanic Arts*
, Arlington,	Rushvllle,	*Arts, Opt.*
all, Holmes,	Cleveland, O.,	*Arts*
;on, David,	Dunkirk,	*Optional*
ews, Albert Franklin,	Orange, N. J.,	*Arts, Opt.*
ews, Peter Baldey,	Plainfield, N. J.,	*Mechanic Arts*
ell, Emma Eliza,	North Clymer,	*Optional*
aw, DeWitt Hiram,	Binghamton,	*Arts*
, Harvey Irving,	Richmond, Ind.,	*Engineering*
Edward Partridge,	Kingsbury,	*Optional*
Horace,	Ithaca,	*Philosophy*
Albert,	Bloomville,	*Engineering*
William Henry,	Stafford,	*Engineering*
Charles Caldwell,	Alleghany City, Pa.,	*Philosophy*
son, Roswell Henry,	Herrick Centre,	*Science and Letters*
, Lewis Taber,	Tonawanda, Pa.,	*Science and Letters*
ɔn, Edward,	Sedalia, Mo.,	*Engineering*

Pierce, Jerome Victor,	Buffalo,	*Optional*
Place, Edwin,	Cincinnatus,	*Engineering*
Potter, Charles Anson,	Alpine,	*Science and Letters*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Agriculture*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science and Letters*
Raynor, George Cartwright,	Riverhead,	*Literature*
Reed, James William,	Warrensburgh,	*Literature*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*
Richards, Walter Barnes,	Leavenworth, Kan.,	*Mechanic Arts*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*
Runyon, Frank Willits,	Plainfield, N. J.,	*Literature*
Russel, Frank Channing,	Ithaca,	*Arts*
Searing, Byron Hudson,	Sherwood,	*Science*
Serat, Seth Swift,	Elmira,	*Science and Letters*
Scherer, Robert George,	Albany,	*Science and Letters*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Smith, Delano Eugene,	New York City,	*Science and Letters*
Southwick, John Leonard,	Bombay,	*Science and Letters*
Sprout, Helen Louise,	Brooklyn,	*Science and Letters*
Stevenson, George Edward,	Clark's Green, Pa.,	*Agriculture*
Stuart, George Anson,	Skaneateles,	*Philosophy*
Sullivan, Frank Robert,	Pompey Centre,	*Optional*
Sweet, Vaughn Charles,	Phœnix,	*Mechanic Arts*
Thayer, George Henry,	Plymouth, Ind.,	*Philosophy, Opt.*
Tinsley, Henry Greenwood,	Lyons,	*Arts, Opt.*
Tomkins, Walter,	Newark, N. J.	*Arts, Opt.*
Vaughan, James Frye,	Springville,	*Arts, Opt.*
Welby, Arthur Adlard,	Rie de Janeiro, Brazil,	*Mechanic Arts*
Weston, Fred Abijah,	Painted Post,	*Science and Letters*
Wetherell, Jane Johnson,	Philadelphia, Pa.,	*Science and Letters*
Wheeler, Amos,	Ithaca,	*Optional*
Wheeler, William Murray,	Varna,	*Philosophy*

pley, James Davenport,	Hastings on the Hudson,	*Agriculture*
ney, Harry Leroy,	Plymouth, Pa.,	*Science and Letters*
›x, Fred Clarence,	Ithaca,	*Arts*
›x, Fred Elmer,	Ithaca,	*Agriculture*
lruff, Eva Eliza,	Ithaca,	*Arts*
Florence Lincoln,	New York City,	*Science and Letters*

SUMMARY BY YEARS.

Graduates	6
In Senior or Fourth Year Studies	89
In Junior or Third Year Studies	111
In Sophomore or Second Year Studies	11
In Freshman or First Year Studies	119
	441

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	12	17	19	23	71
Literature	6	6	7	7	26
Philosophy	4	5	7	7	23
Science and Letters	33	35	28	32	128
Science	5	2	1	4	12
Mathematics	1	1	1	0	3
Natural History	7	3	4	0	14
Agriculture	5	11	12	7	35
Architecture	2	3	2	3	10
Chemistry and Physics	0	0	1	0	1
Civil Engineering	9	14	5	9	37
Mechanic Arts	4	6	5	15	30
Medical Preparatory	0	1	6	0	7
History and Political Science	0	2	7	0	9
Optional	1	5	11	12	29

Total of Undergraduates	435
Graduates	6
Total in the University,	441

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell. On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868–69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds. "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum.*

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course,* under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactcrily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work: but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

The University is situated on grounds overlooking ITHACA, a town of about twelve thousand inhabitants, at the head of Cayuga Lake, in Tompkins County, New York.

The town has five distinct lines of communication with the great thoroughfares, viz:

The *Geneva, Ithaca and Sayre Railroad*, running south, connecting with the Lehigh Valley Railroad for Towanda, Bethlehem, Philadelphia, etc; running north-west to Geneva and Lyons on the New York Central and Hudson River Railroad. The *Cayuga Railway*, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga Lake Steamers*, during navigation, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga and Susquehanna Division* of the *Delaware, Lackawanna and Western Railroad*, running south to Owego on the New York, Lake Erie and Western (formerly Erie) Railway. The *Utica, Ithaca and Elmira Railway* starts from the immediate vicinity of the University buildings and, running north-east, connects at Cortland for Syracuse and at Canastota with the New York Central and Hudson River Railroad; running south-west to Elmira on the New York, Lake Erie and Western (Erie) Railway, connects with the Northern Central Railway for Harrisburg, Baltimore, Washington, etc.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge*. Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science,

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Students not in the full course may take a partial course not leading to a degree, consisting of mechanics, building materials and construction, styles of architecture, draughting and designing, which can be completed in about two years.

III. CHEMISTRY AND PHYSICS

1. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "Theory of Heat," Schellen's "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred (1) on those who have completed the five years course and (2) on those who take the Bachelor's degree in Engineering, after two years spent in practice and study, on passing the requisite examinations and presenting a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science is intended to embrace all the important topics connected with political and social science.

The following is a list of the lectures given in this department: (1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2) Modern history, and the philosophy of modern history, by President White. (3) The general and constitutional history of England, by Professor Goldwin Smith. (4) General history, and the philosophy of history, by Professor Wilson. (5) History of the United States, by Professor Russel. (6) Political economy, by Professor Wilson. (7) A course of lectures on the constitution of the United States and American jurisprudence, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.* —Cicero (Essays and Letters.) *Third Term* —Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.* —Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elementary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos*, *Turkish*, the *Tartar Languages*, *Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year,*—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees have authorized and instructed the Faculty to make such arrangements that any student may, *after his first year in the University*, substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students that take Drill must continue it through the term. They are required to provide themselves with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe.

The object of the Drill and Military Instruction is not merely that knowledge of tactics and military evolutions that is required of the practical soldier. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term, and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma.

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany: field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies—Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy and transcendental logic.

Second Term.—Moral philosophy theories or morals and the development of moral sentiments. For the present Moral Philosophy and Political Economy alternate with each other, each subject being treated only once in two years. The Junior and Senior classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a course of lectures on the Philosophy of History. And in the third term of that year a course of lectures is delivered on Law and Jurisprudence, including the three branches, Constitutional, International, and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's *Brut* or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; tc extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require; and in fact they are so used on all occasions when the University Sermons spoken of above—under the head of religious instruction, are delivered.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

I. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake*; a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to *twelve* inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell: (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

Beginnings of a Museum in this department have been made by the following acquisitions: (1) A number of large portraits, busts and medallions of persons connected with the History of the University; (2) A number of bronze copies of masterpieces of statuary, by Barbedienne and others; (3) A collection of over 1500 large photographs, illustrating the architecture and sculpture of the principal ancient and modern nations and periods of art; (4) A considerable collection of casts, illustrating the History of Art, from the establishment of Brucciani in London, from the *Moulage* of the Louvre, and from the Modeling Establishment connected with the Museum of Berlin; (5) A large number of engravings illustrative of Christian Art and of the History of Art in general, including a very full set of the publications of the Arundel Society illustrative of Early Christian Art, a full set of Piranesi, the Heliotype reproductions of the Gray Collection, etc.; (6) A collection embracing about 700 specimens of Medallion Casts, from the Stosch and other German collections, made by Eichler of Berlin; (7) A collection of drawings and casts made under the direction of the South Kensington Museum and the Academies of Fine Arts in Paris and Berlin, and similar Institutions, arranged for the use of students in Free Hand Drawing, especially with reference to the needs of the department of Architecture; (8) A large collection of proofs and other engravings illustrative of recent art, especially of the German and French schools.

VIII. UNDERGRADUATE SOCIETIES.

Besides the instruction given to the students directly by the professors, the students have organized several societies for the promotion of religion, literature, science, and the practical arts. Rooms are set apart for their use in the University Buildings, and the University gladly affords such facilities as are within its power for the furtherance of the objects of these societies.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All students, unless provided with Certificates and Diplomas as specified below, must pass Entrance Examinations in: (1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations, including Radicals.

Applicants passing these examinations will be admitted as students in the Courses in Agriculture, Architecture, Civil Engineering and Mechanic Arts, or as Optional students.

For these examinations Certificates or Diplomas will be accepted as follows:

(*a*) Regents' *Certificates* issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography, and English Grammar.

(*b*) Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by the Academies and High Schools of the State of New York whose requirements for graduation are approved by the Faculty and whose course of study requires Physiology and Plane Geometry, will be accepted instead of an entrance examination in all the subjects named above except Algebra.

(*c*) Diplomas issued to graduates from the High Schools and Academies of the State of New York will be accepted instead of examinations in all the six subjects named above.

2. For admission to any of the other Courses other examinations will be required as follows:

1. For the Courses in Science, Science and Letters, Mathematics, and Chemistry and Physics, either in (1) the principles of French Grammar, the translation of English into French, and of three books of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar, the translation of English into German (Whitney's or Comfort's German Grammar preferred),

and seventy-five pages of Whitney's Reader or its equivalent; or (3) Algebra entire (*any of the larger ones*), Solid Geometry, including Conic Sections, and Trigonometry, Plane and Spherical.

2. For the Course in Natural History, candidates will be examined in French or German as above; in Plane Trigonometry; four books of Cæsar's Commentaries or some equivalent, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

3. For the Course in Literature and that in Philosophy, in French, German, or advanced Mathematics as above; and in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Catiline, eight orations of Cicero, or five orations and the *de Senectute*, Virgil's Eclogues, and six books of the Æneid.

4. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, and in Latin the same as for the Course in Literature; in Greek, Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

Students who wish to enter any one of the above named courses that require the French, German, or the extra mathematics, and are not prepared to pass the examination in those subjects, can enter as optional students and make up these deficiencies by reciting with the classes in the University.

5. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

The Examinations at the University will be held on the days indicated in the Calendar, pp. 7 and 8.

1. On the first day the examinations will be in Arithmetic, 9 a.m.; Geography, 11 a.m.; and English Grammar beginning at 3 p.m.

On the second day, Plane Geometry, 9 a.m., Physiology, 11:30 a.m., and in Algebra beginning at 2.30 p.m.

On the third day, Solid Geometry, including conic sections, 8 a.m., French, German, and Greek, each beginning at 9 a.m., Advanced Algebra, 10.30 a.m., and Latin and Trigonometry, each at 2.30 p.m.

2. Entrance Examinations will also be held in June, 1880, at Chicago, Cleveland and Boston. The Examinations will be the same and on the same days for the second and third days, June

15th and 16th; but the examinations assigned for the first day at the University will be held in those places on Thursday, the 17th.

These Examinations will be held as follows:

In Chicago at the Central High School;

In Cleveland at the Board of Education Building, 443 Euclid av.

In Boston at the Chauncey High School.

For admission to these Examinations a fee of Five Dollars will be charged to each applicant, which, however, will be credited to him towards his tuition for his first term in the University.

Persons intending to enter any of the Examinations besides those held at the University are requested to give notice of their intention to the Registrar as early as the 10th of June preceding the Examinations.

Candidates who give such notice of their intention will be informed by mail of the result of the Examination as soon as it can be ascertained.

Candidates for examination, whether at the University or at either of the places named above, should be present on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the time appointed for the next entrance examination.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

DIRECTIONS FOR ADMISSION.

The candidate applying for examination at the University will first apply to the Registrar, at South University Building, and get a permit for examination.

In case he come from another college or university, with the "Dismissal" described below, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing *all the* examinations required, and showing to the professor his *registration* ticket.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission *after having passed at least one term's examinations.* The dismissal must certify to both good character and scholarship, or be accompanied by other testimonials to that effect.

Such a dismissal will admit the applicant to the Courses in Agriculture, Architecture, Civil Engineering and Mechanic Arts.

But if the applicant wishes to enter any one of the Courses that requires for admission anything more than the six subjects named on p. 78, as required of all students, he must pass the additional examinations required for admission to that Course.

ADMISSION TO AN ADVANCED STANDING.

Students who come from other colleges, or who have prepared themselves in a part of the studies in any one of our Courses, elsewhere, *are in no case* admitted *at once* to any specific advanced standing, as Sophomore, Junior, or Senior.

The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of the University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to distinctions.

Any student wishing to enter an advanced class in any study must apply to the professor in charge of the department whose class he proposes to enter, and undergo such examinations as he may require.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to, without examination in the studies pursued elsewhere.

TIME REQUIRED FOR GRADUATION.

No student will be permitted to graduate who has not pursued the studies of his course for four entire years in this University; except those who, having pursued part of the studies of their course before coming here, propose to enter at an advanced standing. But in order to do so they must pass up, before the close of their first year, in all the studies that have been pursued by the class they intend to enter. Any students who, by sickness or absence on leave, have lost a part of their time will be allowed in

some cases to take more than the regular studies of their course by asking permission of the Faculty at the beginning of each term. Otherwise no extra studies will be taken into account in considering the qualifications for graduation.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations, or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on graduates in the Course in Philosophy on the same conditions as though they had graduated in the Course in Science.

The degree of CIVIL ENGINEER will be conferred (1) on Bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presentation of a satisfactory thesis; (2), on those who have completed the five years course, at their graduation.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of the University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course of Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications to the Registrar and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given :

1. To all State students appointed as described on p. 35.

2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.

3. In order to encourage the study of Agriculture and the sciences more immediately related to it, the Trustees decided to give free tuition to all students in Agriculture; and in 1877, at the expiration of the first period, they voted to extend the same favor to that class of students for three years more. Under this rule free tuition is given to agricultural students who are pursuing either the three or the four years course and *intending to complete* the course.

For all others the tuition fees are twenty-five dollars a term.

There is also a charge of five dollars as a graduation fee which must be paid by each student before taking any Baccalaureate Diploma, and the same sum for any second degree.

No matriculation or entrance fees are required, nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

EXPENSES OF RESIDENCE.

The following is an approximate estimate of the yearly expenses :—

Fees for instruction, $25 a term, - - - - - -	$ 75.00
Room, board, lights and fuel, about - - - - -	240.00
Total, - - - - - - ·	$315.oc

Cascadilla Place is owned by the University, and is rented to professors and students, each taking one room or more as he may choose. There is a janitor living in the building to take care of it and do such work for the inmates as they may choose to employ him to do.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and lights, varies from $5.50 to $7.50 per week. The rooms are all furnished and carpeted. Students occupying one of the most desirable rooms alone, pay $7.50 per week. If two occupy such rooms together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 each per week. The entire building is warmed by steam, and in most rooms the sleeping apartments are separate from the ordinary studying room. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The courses of study are arranged in four classes: (1.) those aiming at general culture; (2) those aiming at special culture in some departments; (3) technical courses or those that are designed to prepare the students for some kind of practical work; (4.) partial courses leading to no degree.

In stating the courses the figures in parentheses ( ) indicate the number of recitations or lectures per week, and studies named in *italics* are optional, and those with an "*or*" between them are equivalents for each other.

In computing Laboratory Practice two hours and a half of actual work are regarded as equal to one recitation.

In Draughting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. GENERAL COURSES.

1. THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); geometry and conic sections (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1); *physiology, French, German, mathematics, chemistry, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism.*

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, chemistry, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (12).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term.—Logic (3); essays and criticism (1); *Greek, Latin, modern languages, English literature, mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (3); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors; *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

2. THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); Latin (4); physiology (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (5); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

Second Term.—Moral philosophy (2); history of the Roman empire (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

Third Term.—Logic (3); mediæval history (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (3); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement

3. THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Algebra (5); Latin (4); French *or* German (5); zoology (3).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); astronomy (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); analytical geometry (5): electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—German *or* French (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice, chemical or botanical (5); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (5); chemistry (2); geology (3): heat (3); essays (1); English literature (2).

Second Term.—Moral philosophy (2); history of the Roman empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (2).

Third Term.—Logic (3); mediæval history, science *or* languages (8); acoustics and optics (3); essays (1); English literature (2).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (3); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

4. THE COURSE IN SCIENCE AND LETTERS.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3): rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); rhetorical exercises (1); science or modern languages (3)

Second Term.—French *or* German (3); zoology (3); chemistry (3); rhetorical exercises (1); analytical geometry *or* science and modern languages (5).

Third Term.—French *or* German (3); botany (3); chemistry (3); rhetorical exercises (1); calculus *or* modern languages and science (5).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); geology (3); physics (3); English literature (2); essays (1).

Second Term.—Moral philosophy (2); history of the Roman empire (5); physics (3); English literature (2); essays (1); *optional* (3).

Third Term.—Logic (3); mediæval history (5); physics (2); English literature (2); essays (1); *optional* (3).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (3); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

II. SPECIAL COURSES.

Leading to the Degree of Bachelor of Science.

1. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); zoology (3).

Third Term.—Trigonometry (5); French (5) and German (3) *or* or German (5) and French (3); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); experimental mechanics (3); rhetorical exercises (1).

Second Term.—French *or* German (3); zoology (3); analytical geometry (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—French *or* German (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice, chemical or botanical (5); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (3); chemistry (2); geology (3); English literature (2); essays (1); *optional,* six hours, of which at least three must be given to one of the following sciences: *botany, chemistry* or *zoology.*

Second Term.—Acoustics and optics (3); geology (3); English literature (2); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry* (including *mineralogy*) or *zoology.*

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (2); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry, geology* or *zoology.*

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

2. THE COURSE IN MATHEMATICS.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French and German (8); rhetoric and composition (2); linear draughting (2).

Third Term.—Trigonometry (5); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (3); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); astronomy (3); shades, shadows and perspective (3); modern history (3); geology (3); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); philosophy of history (3); English literature (1); *optional* (5).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6.)

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

3. THE COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—French and German (8); rhetoric (2); free-hand drawing (5); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); rhetoric (1); lectures on human physiology (3); lectures and laboratory work in anatomy (3); experimental mechanics (3); organic chemistry (2).

Second Term.—French *or* German (3); rhetoric (1); lectures on zoology (3); lecture and laboratory work in physiological anatomy and histology (6); blow-pipe determination of minerals (3).

Third Term.—French *or* German (3); rhetoric (1); general lectures on botany (3); field work in botany (3); lectures on the comparative anatomy of the brain (2); laboratory work in zoology (4).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); psychology (2); heat (3); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3); electricity and magnetism (2); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); entomology (2); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (3); electricity and magnetism (2).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); astronomy *or* lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (3).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (5); acoustics and optics (3).

Third Term.—Advanced work in botany, geology or zoology, or veterinary medicine and surgery (10); acoustics and optics (3).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology.

III. TECHNICAL COURSES.

1. THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Chemistry, general (3); algebra (5); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry and mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).

Third Term.—Botany lectures (3), field work (2); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams) (3), compositæ and field work *or* practical horticulture (2); geology (3); heat (3); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology), lectures (3); vegetable histology and laboratory work *or* practical horticulture (2); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work *or* practical floriculture (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3) (Tuesday and Thursday afternoons); botany (fungi) (3), principles of horticulture (2); geology, practice (3).

Second Term.—Agriculture, lectures (5); practice (2) (Tuesday and Thursday afternoons); botany (systematic and applied, lectures) (3), laboratory work on gramineæ or special groups (2); horticulture (2).

Third Term.—Agriculture, lectures (3); practice (3) (Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (5).

2. THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing (1); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting (1).

Third Term.—Trigonometry (5); descriptive geometry (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry and draughting (6); French *or* German (3); experimental mechanics (3); free-hand drawing (3); essays (1).

Second Term.—Analytical geometry (5); French *or* German (3); chemistry (3); electricity and magnetism (2); draughting (2); essays (1).

Third Term.—Building materials and construction (3); French *or* German (3); calculus (5); chemistry (3); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows and perspective (3); mechanics (3); heat (3); lectures on Egyptian, Greek, and Roman architecture (3); lectures on designing and designing (4).

Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing (4).

Third Term.—Optics and acoustics (3); lectures on Gothic architecture (5); free-hand drawing (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); geology (3); designing (6); stereotomy (3).

Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).

Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

3. The Course in Chemistry and Physics.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French and German (8); rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (3); geology (3); chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (3); physical practice (4); chemical practice (10); organic chemistry (1).

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (8); organic chemistry (1); thesis.

4. COURSES IN CIVIL ENGINEERING.

A Four Years Course, Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Tuesday in the term.

Second Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).

Third Term.—Trigonometry (5); descriptive geometry (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); descriptive geometry (4); French *or* German (3); experimental mechanics (3); essays (1).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2); tinting and shading (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering (2).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); geology (3); shades, shadows and perspective (3); heat (3); topographical mapping and sketching (2); essays (1).

Second Term.—Advanced geology (3); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); architecture (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); geodesy (5); stone cutting, original problems and draughting (5); metallurgy (2).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to *write* memoirs upon subjects selected by themselves before the close of the spring term. During the last two years of the course they will be required to embody in their reports, reviews or memoirs of original investigations.

A FIVE YEARS COURSE.

Leading to the Degree of Civil Engineer.

The first and second years the same as in the preceding course. The studies in *italics* are introduced chiefly from the Course in Science and Letters, those in SMALL CAPITALS are new and of a technical character.

THIRD YEAR.

First Term.—Calculus (5); *Roman history* (5), *or physiology* (3), *and modern languages* (2); heat (2); topographical mapping (2); *essays and English literature* (2).

Second Term.—*Philosophy of history* (3); *history of the Roman empire* (5); *or, zoology* (3); *modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1); mechanics (5); acoustics and optics (3); structural details (2).

Third Term.—Mechanics (5); railroad surveying (5); acoustics and optics (3); *mediæval history* (5); *or, laboratory work* (3); *and modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1).

FOURTH YEAR.

First Term.—Geology (3); mechanics (5); Egyptian, Greek, and Roman architecture (3); shades, shadows and perspective (3); civil engineering (2); *American history* (2); *or, general literature and oratory* (3).

Second Term.—Geology (3); mechanics (5); *American history* (2); *or, Romanesque architecture* (3); *or, modern languages* (2); *political economy* (2); *general literature and oratory* (3).

Third Term.—Civil engineering (3); *logic* (3); *or, modern languages* (3); *or, general literature and oratory* (3); *or, Gothic architecture* (3); engineering economy (2); bridge construction (5); colored topography (3); two weeks hydrographic practice (3).

FIFTH YEAR.

First Term.—Spherical and practical astronomy (5); *modern history* (3); stereotomy and draughting (5); SPECIAL WORK IN

PROJECTS, DESIGNS AND ESTIMATES (3); or, RENAISSANCE ARCHITECTURE (3).

Second Term.—Geodesy (5); stone cutting (5); metallurgy (2); TECHNICAL READING IN FOREIGN LANGUAGES (2); SPECIAL WORK IN ASTRONOMY AND GEODESY (3).

Third Term.—*American law and polity* (5); *or, quarternions and philosophy of mathematics* (5); hydraulic motors (3); *historical reading* (2); hydrography (3); THE STEAM-ENGINE (2); original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

5. THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); free-hand drawing and shop practice (5).

Second Term.—Algebra (5); French *or* German (5); free-hand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (4); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3),

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); shades, shadows and perspective (3); heat (3); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

IV. SHORTER COURSES.—LEADING TO NO DEGREE.

1. A THREE YEARS COURSE IN AGRICULTURE.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); chemistry, agricultural (5); chemical practice (3); drawing, freehand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); algebra (5).

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

Third or Junior year same as the fourth year of the four years course.

2. A TWO YEARS COURSE PREPARATORY TO THE STUDY OF MEDICINE.

Requirements for admission the same as in the Natural History Course, except the year of French or German.

FIRST YEAR.

First Term.—French (5); physiology (3); heat or psychology (2); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2); six lectures on hygiene.

Second Term.—French (5); zoology (3); chemistry, lectures (3); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2).

Third Term.—French (5); general botany, lectures (3); botanical laboratory practice (2); lectures on chemistry (3); medical chemistry, laboratory practice (4); rhetoric and composition (2).

SECOND YEAR.

First Term.—German (5); organic chemistry (2); psychology or heat (2); anatomy and physiology of domesticated animals (5); laboratory practice in anatomy (3); five lectures on medical entomology in alternate years.

Second Term.—German (5); vegetable physiology, or systematic and applied botany (3); acoustics and optics (3); veterinary medicine (5); laboratory practice in physiological anatomy and histology (3); laboratory practice in vegetable physiology (2).

Third Term.—Scientific German (3); comparative anatomy of the brain (2); acoustics and optics (3); veterinary medicine and surgery (5); laboratory practice in physiological anatomy (5).

Upon the completion of the course the student will receive a certificate, signed by the President and Professor of Physiology. This certificate, or one covering the same branches when pursued in other courses, is accepted by most medical schools as exempting the student from one of the three years now required for graduation in medicine.

3. A Two Years Course in History and Political Science.

Requirements for admission the same as for Optional Students, with the addition of Latin Grammar and four Books of Cæsar.

FIRST YEAR.

First Term.—Roman history (5); psychology (2); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5); six lectures on hygiene beginning the first Monday in the term.

Second Term.—History of the Roman Empire (5); moral philosophy (2) rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

Third Term.—Mediæval history (5); logic (3); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

SECOND YEAR.

First Term.—Modern history (3); American history (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Third Term.—American law (5); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

On the completion of the course the student will have a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{8}{3}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{10}{31}$, and $\frac{1}{3}$.

Simplify $$\frac{1}{1+\dfrac{2}{3\frac{4}{5}}}.$$

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.1\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for $1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, $250; Dec. 5, 1876, $400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argentine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*. *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.

16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?

17. State some of the uses of *it*.

18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.

19. What is the objective or factitive predicate?

20. Write out correctly the following sentences:

(*a*) One fine afternoon everybody was on deck amusing themselves as they can.

(*b*) Whom but he was true to me.

(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.

(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.

(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.

(*f*) Man could now travel further in an hour than he had previously in a day.

(*g*) Six month's interest are due.

(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.

(*i*) Nothing need to be said so firmly and nothing oftener than this.

(*k*) How will we know which is the greatest of the two?

21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.

22. Write a sentence containing an adjective clause, drawing a line under the clause.

23. Write an interrogative sentence, and parse it.

24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.

2. To draw a common tangent to two given circles; and demonstrate.

3. Two triangles are similar, if their homologous sides be proportional.

4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.

5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to find the surfaces [or the perimeters] of the regular inscribed and circumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

For the present no questions will be asked upon the Nervous System, or Organs of Sense. Omitting these subjects, students are advised to prepare for the examination by the aid of either of the following named works:

1. Newton's Introduction to Animal Physiology, with Directions for Practical Work. 5th ed. 16 mo., pp. 186, 98 figures. London, 1878.
2. Foster's Primer of Physiology. 3d ed. 16 mo., pp. 132, 18 figures. London, 1878.
3. Dalton's Physiology and Hygiene. 12 mo., pp. 424, 78 figures. New York, 1878.
4. Huxley and Youman's Physiology and Hygiene. 12 mo., pp. 485, 128 figures. New York.
5. Cleland's Animal Physiology. 16 mo., pp. 325, 158 figures.
6. Steele's Fourteen Weeks in Physiology.
7. Cutter's Anatomy, Physiology and Hygiene.
8. Hutchinson's Physiology.

In addition to the works above named, there are others which furnish the requisite information, and of course the larger Manuals of Foster, Dalton, Flint, Küss, Draper, Carpenter, etc., are more than sufficient. The three first-named are recommended to students who take the course upon Physiology in the University.

In place of, or in addition to, the text-book study above indicated, students are advised to make themselves *practically* familiar with the structure, properties and functions of tissues and organs, as presented in Huxley and Martin's Elementary Biology (sections upon Amæba and Frog), and Foster and Langley's Practical Physiology, lessons I–XIV inclusive. The cat may be substituted for the dog and rabbit.

The following questions may indicate the nature of the examination:

1. Name the chemical elements of the body, stating which are gases.
2. What first happens to milk in the stomach?
3. Enumerate the digestive fluids, stating which is acid..
4. State all the uses of the stomach.
5. What is the object of digestion?
6. Give a diagram of the right side of the heart.
7. What is the heart composed of?
8. What are the differences between the air inspired, and the air expired?
9. Give some familiar examples of acids.

10. Give some familiar example of alkalies.
11. Which way does blood flow in the arteries of the arm? Which way in the veins of the arm? How do you know?
12. Explain the pulse.
13. Name the uses of the tongue.
14. Name the uses of the lips and cheeks.
15. What happens in the throat when you swallow?

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

simplify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4^4x+1+3x^2$ by $-2x+3+2x^2$, finding the quotient to 3 terms, the remainder. and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a positive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{8}{0}$? Of $\frac{0}{8}$, and why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is now half full, n gallons of water flow per minute, and 10 gallons flow out. How soon will the cistern be empty? Interpret your result when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always divisible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $5x+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your result.

(*c*). Find how far you must ride at the rate of a miles an hour, and walk back at the rate of b miles an hour, to be gone c hours.

6 (*a*). Reduce the following radicals to their simplest form, and add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify $\dfrac{3^{-\frac{1}{3}}\,a^{\frac{4}{9}}}{3^{\frac{2}{3}}\,a^{-\frac{5}{9}}}\,(2b)^{\circ}$; also, $(5^{\frac{2}{3}})^{\frac{3}{4}}$.

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{\frac{-n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{\frac{-n}{2}}\right)$.

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(ι). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(c). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}$.

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

1. Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.

"Es mögen nun etwa acht Tage her sein, da ritt ich in die freie Reichsstadt ein, welche dort jenseit des Forstes gelegen ist. Bald darauf gab es darin ein schönes Turnieren und Ringelrennen, und ich schonte meinen Gaul und meine Lanze nicht. Als ich nun einmal an den Schranken still halte, um von der lustigen Arbeit zu rasten, und den Helm an einen meiner Knappen zurück reiche, fällt mir ein wunderschönes Frauenbild in die Augen, das im allerherrlichsten Schmuck auf einem der Altane stand und zusah. Ich fragte meinen Nachbar, und erfuhr, die reizende Jungfrau heisse Bertalda, und sei die Pflegetochter eines der mächtigen Herzoge, die in dieser Gegend wohnen. Ich merkte dass sie auch mich ansah, und—wie es nun bei uns jungen Rittern zu kommen pflegt—hatte ich erst brav geritten, so ging es nun noch ganz anders los. Den Abend beim Tanze war ich Bertalda's Gefährte, und das blieb so alle die Tage des Festes hindurch."

2. Parse the following nouns, writing the genitive singular and nominative plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* (3), *Arbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

3. Parse fully the following verbs, giving the principal parts, rule for the mood, tense, and position of each: *mögen* (1), *ritt* (1), *gelegen ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisze* (10).

II.

1. Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dasz* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc, quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum, sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione, voluntatis, concursare, for-*

tuna. Explain the subjunctives *sit*, *cupiat*, *velint*. Decline *nemo*, *vestrum*, *operis*, *quaestus*. To what classes of verbs do *perhorrescat*, *audet*, and *concursare* belong? Give the principal parts of *cupiat*, *audet*, *coeptum est*. Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat*. Compare *bene*, *felix*, *facilis*, *primus*, *vetus*. State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris*? Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας*.

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs are *εἶδεν*, *δεδέσθαι*, *περιρρυῆναι*?

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of ἔχοντες, ἀνέκαυσαν, ἦλθον. Explain the phrase ἀθύμως ἔχοντες: the *case* of σίτου.

4. Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.

Give the acc. sing. in all genders of πλείους: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε αποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.

Give synopsis of the tense and voice to which ἀφείς belongs. Point out the enclitics in this passage. Explain the mood of τολμᾷ.

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of θείη and ποσσί. In what tense, mood, voice, and from what verbs, are ἔγρετο and ἀμφέχυτο? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τὼς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of προσεφώνεε, μέσσῳ, ὄληαι. In what tense, mood, voice, and from what verbs, are ἀπεχθήρω and ὄληαι?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.

2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.

3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).

4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere are 85°, 100°, and 130°. Find the area of the spherical triangle in square inches.

PLANE AND SPHERICAL TRIGONOMETRY.

[Those examined only in Plane Trigonometry omitted Questions 6, 7 and 8. Those examined in Trigonometry entire omitted Questions 1 (a) and 5.]

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Show that $\sin(180° - A) = \sin A$, and $\tan(180° - A) = -\tan A$.

2 (*a*). Trace the changes in the sign and value of $\cos A - \sin A$, as A changes from 0° to 180°.

(*b*). Find the six logarithmic functions of 243° 25′ 5″. What functions of this angle are negative?

3. Two sides of a plane triangle are 10 and 20, and the included angle is 60°. Find (*a*) the area; (*b*) the remaining side; and (*c*) the remaining angles.

4 (*a*). Prove that $\cos(A+B) = \cos A \cos B - \sin A \sin B$; and hence show that $\cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$.

(*b*). Obtain the value of $\sin A$ in terms of $\tan A$.

(*c*). If $\tan A = 2\sin A$, find the value of A.

5. In a plane triangle, given $a = 584.7328$, $b = 367.4001$, and $B = 37° \, 42' \, 13''$, find the remaining angles and side.

6. Prove that, in a spherical triangle right-angled at C, $\sin a = \sin A \sin c$.

7. From the formula $\cos a = \cos b \cos c + \sin b \sin c \cos A$, derive the formula

$$\tan \tfrac{1}{2} A = \sqrt{\frac{\sin(s-b)\sin(s-c)}{\sin(s-a)\sin s}}.$$

8. Given $a = 36°$, $b = 49° \, 37' \, 34''$, $c = 76° \, 14' \, 26''$, find A.

ADVANCED ALGEBRA.

1 (*a*). Demonstrate the following formula in Geometrical Progression:

$$S=\frac{a(r^n-1)}{r-1}$$

(*b*). Find the sum of the series $1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\ldots$ to six terms; also, to infinity. What do you understand by the sum of an infinite series?

2. Reduce $\pi,=\frac{31416}{10000}$, to a continued fraction; and from this, find three successive approximate values of π.

3. Find the number of combinations of ten things, taken four at a time; and give the reasoning.

4. Write and demonstrate the Binomial Formula.

5. By the Method of Differences, find the 101st term of the series 1, 7, 15, 25, 37, . . ; and likewise the sum of the first 101 terms of this series.

6. Express $\frac{4x}{x^2-9}$ as the sum of two fractions whose denominators are $x+3$ and $x-3$, using the Method of Undetermined Coefficients.

7. What is meant by the logarithm of a number n in a system whose base is b? Prove that $\log n$, when the base is b, and $\log b$, when the base is n, are reciprocals of each other.

8. Prove that if r be a value of x that satisfies the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\ldots+K=0,$$

then the first member is divisible by $x-r$; and conversely.

9 (*a*). Write the equation whose roots shall be 0, -2, -2, $1+\sqrt{-1}$, and $1-\sqrt{-1}$.

(*b*). What are conjugate imaginaries? Prove that if the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\ldots+K=0$$

has imaginary roots, they are in pairs. [The known quantities A, B, . . . K are supposed to be real.]

10. Find a commensurable root of the equation $x^4+2x^3-x^2+35x+37=0$, then depress the degree of the equation, and find an incommensurable root to three decimals.

DEGREES AND PRIZES.

ORDER OF EXERCISES AT THE ELEVENTH ANNUAL COMMENÇEMENT.

THURSDAY, JUNE 19, 1879.

The Lord's Prayer.

1. DISSERTATION—The Legitimate Function of the Scholar in Politics,
   FRANK HAYWARD SEVERANCE, *Whitewater, Wis.*
2. THESIS IN MECHANIC ARTS—The Emery Wheel,
   HENRY MARX, *Toledo, Ohio*
3. *ESSAY IN ARCHITECTURE—Symmetry and Symbolism in Architecture, FRANK AYLES WRIGHT, *Newburgh*
4. *THESIS IN CIVIL ENGINEERING—Review of Bridge 69, Susquehanna Division, on the Erie Railroad,
   CHARLES VERNON MERSEREAU, *Union*
5. ORATION—The Genius of Sophocles as shown in the Antigone, JAMES AUGUSTUS HAIGHT, *Oshkosh, Wis.*
6. DISQUISITION—Is Suffrage a Natural Right?
   EDWARD CHANNING RUSSEL, *Ithaca*
7. *MATHEMATICAL ESSAY—The Method of Equipollences, LENA LILIAN HILL, *Isle La Motte, Vt.*
8. *THESIS IN NATURAL HISTORY—Comparison of the Antebrachial Muscles of Man and Cat,
   JOHN HENRY WEIR YOUNG, *Cold Spring*
9. *HISTORICAL ESSAY—The Influence of Madison and Hamilton on the Constitution,
   LUTHER HENRY PORTER, *East Orange, N. J.*
10. *THESIS IN CIVIL ENGINEERING—The Wave of Translation, EUGENE EDWIN HASKELL, *Forestville*
11. ORATION—The Spirit of Modern Scientific Investigation,
    EDITH WOODMAN BRADFORD, *Cambridge, Mass.*
12. DISSERTATION—The German and American Methods of Dealing with Socialism, FRED ELIAS SMITH, *Moravia*

13. *THESIS IN CIVIL ENGINEERING—Oblique Arches,
FREDERIC SIMPSON, *Lodi*
14. ESSAY IN MECHANIC ARTS—The Influence of Mechanical Education on Invention,
WALTER CRAIG KERR, *St. Peter, Minn.*
15. *ESSAY—Minority Representation,
WILLIAM SEYMOUR EDWARDS, *Coalburgh, W. Va.*
16. *THESIS IN VETERINARY SCIENCE—Pneumo-Enteritis Contagiosa,
ARTHUR MANLY FARRINGTON, *Orono, Me.*
17. *DISQUISITION—The Financial Views of John Locke,
GEORGE MATSON WELLES, *Elmira*
18. *THESIS IN ARCHITECTURE—Sanitary Precautions in House Building, NORIYUKI KOZIMA, *Tokio, Japan*
19. *THESIS IN MATHEMATICS—Maxima and Minima of a Function of Several Variables,
ARTHUR SAFFORD HATHAWAY, *Decatur, Mich.*
20. ORATION—The Oratory of William Pitt, Earl of Chatham,
EDMUND JUDSON MOFFAT, *Chatham*

THESES OF CANDIDATES FOR SECOND DEGREES.

21. *RENAL SECRETIONS,
HOWARD PERCY BELLOWS, B.S., *Boston, Mass.*
22. INUNDATIONS AT ITHACA: THEIR CAUSE,
FRANK E. BISSELL, B.C.E., *South Bend, Ind.*
23. *INUNDATIONS AT ITHACA: THEIR REMEDY,
FRANK ADAMS MAXWELL, B.C.E., *Clymer*
24. *THE FRISIAN LANGUAGE AND LITERATURE,
WATERMAN THOMAS HEWETT, A.M., *Ithaca*
25. THE WOODFORD ORATION—Toussaint L'Ouverture and Napoleon Bonaparte,
ALFRED MILLARD, *Omaha, Neb.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the Acting President.

BENEDICTION.

* Not read.

DEGREES CONFERRED IN 1879.

The following is a list of those who received degrees at the annual Commencement at the close of the eleventh academic year, together with the degrees conferred and the residence of each recipient:

FIRST DEGREES.

BACHELORS OF ARTS, (7).

ABRAHAM CANE,	Plattsburgh.
GEORGE ALEXANDER DOUNCE,	Elmira.
JAMES AUGUSTUS HAIGHT,	Oshkosh, Wis.
DAVID ELLIS MORRIS,	Cincinnati, Ohio.
MARY MERRILL PITCHER,	Owego.
EDWARD CHANNING RUSSEL,	Ithaca.
SEWARD ADAMS SIMONS,	Buffalo.

BACHELORS OF LITERATURE, (7).

MARY FRANCES CONDE,	Glenville.
EDWARD COLE HOWLAND,	Poughkeepsie.
HARRIET MARY MILLS,	Syracuse.
EDMUND JUDSON MOFFAT,	Chatham.
ELSIE MANDERVILLE PATTEN,	Binghamton.
SARAH JACKSON RUSSEL,	Ithaca.
MARY ELIZABETH WEED,	North Rose.

BACHELORS OF SCIENCE.

Science and Letters, (31).

WILLIAM MAXON ALBERTI,	New Market, N. J.
CLARENCE NEWMAN BLOWERS,	Syracuse.
EDITH WOODMAN BRADFORD,	Cambridge, Mass.
WALTER CHANDLER,	Weldon, Ill.
WILLIAM SEYMOUR EDWARDS,	Coalburgh, W. Va.
STANFORD JAY GIBSON,	South New Berlin.
HAROLD GIFFORD,	Milwaukee, Wis.
HATTIE LUCINA GREEN,	South Byron.
LENA LILIAN HILL,	Isle La Motte, Vt.
VIRGIL NEWLAND HOSTETLER,	Decatur, Ill.
WILLIS ARNOLD INGALLS,	Peterboro.
CAROLINE COOK JACKSON,	New York City.
ROBERT STREATOR KENT,	Bay Ridge.
CHARLES OTHO LUCAS,	Greenville, Ohio.
ERVIN BARNES MACY,	Port Byron.
EDMUND MAGNER,	Andover.
ALFRED MILLARD,	Omaha, Neb.
EDMUND ROYCE MORSE,	Rutland, Vt.
WHITNEY NEWTON,	Denver, Col.
WILLIAM BERNARD PHILIPP,	Cincinnati, Ohio.
LUTHER HENRY PORTER,	East Orange, N. J.

CLAYTON RYDER,	Carmel.
FRANK HAYWARD SEVERANCE,	Whitewater, Wis.
FRED ELIAS SMITH,	Moravia.
MOSES JAY SPAULDING,	East Poultney, Vt.
CALVIN TOMKINS,	Newark, N. J.
JAMES WARD WARNER,	Rock Stream.
ALFRED WASHBURN,	Chappaqua.
JOHN HENRY WEINMANN,	St. Johnsville.
GEORGE MATSON WELLES,	Elmira.
JULIUS HAYDEN WOODWARD,	Brandon, Vt.

In Natural History, (1).

JOHN HENRY WEIR YOUNG,	Cold Spring.

In Mathematics, (1).

ARTHUR SAFFORD HATHAWAY,	Decatur, Mich.

BACHELOR OF VETERINARY SCIENCE, (1).

ARTHUR MANLY FARRINGTON, (B.S.)	Orono, Me.

BACHELORS OF ARCHITECTURE, (4).

ALBERT BUCHMAN,	New York City.
ADOLPH FLEISCHMAN,	Albany.
NORIYUKI KOZIMA,	Tokio, Japan.
FRANK AYRES WRIGHT,	Newburgh.

BACHELORS OF CIVIL ENGINEERING, (10).

NICHOLAS EPHRAIM FERGUSON,	New Milford.
EUGENE EDWIN HASKELL,	Forestville.
ROBERT HERMAN,	Washington, D. C.
JAMES CARROLL KENNEDY,	Troy, Vt.
CHARLES VERNON MERSEREAU,	Union.
WILLARD OLNEY,	Westernville.
GEORGE FREDERIC SIMPSON,	Lodi.
FRANK WOODWARD SKINNER,	Brownville.
WILLIAM JOSEPH SMITH,	Charleston.
ADDISON WEED,	North Rose.

BACHELORS OF MECHANICAL ENGINEERING, (5).

WALTER CRAIG KERR,	St. Peter, Minn.
JOHN LEWIS,	Ithaca.
HENRY MARX,	Toledo, Ohio.

ROBERT AUGUSTUS PARKE,	Bingnamton.
JOSE PIRATININZA TIBIRICA,	S. Paulo, Brazil.

SECOND DEGREES.

MASTER OF SCIENCE, (1).

HOWARD PERCY BELLOWS, B.S.,	Cornell.

CIVIL ENGINEERS, (2).

FRANK E. BISSELL, B.C.E.,	Cornell.
FRANK A. MAXWELL, B.C.E.,	Cornell.

DOCTOR OF PHILOSOPHY, (1).

WATERMAN T. HEWETT, A.M.,	Amherst.

PRIZES AWARDED.

Woodford Prize in Rhetoric and Oratory—a gold medal—A. Millard.

Horace K. White prizes in Veterinary Science:
1st Prize of twenty dollars—to G. M. Welles.
2d Prize of ten dollars—to E. C. Russel.

PRIZES FOR UNDERGRADUATES FOR 1879–80:

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner..

The subjects for the Woodford prize the present year are as follows:

1. Aim of actors and agents in history and the historical results.
2. Daniel Webster and the Constitution.
3. The Greek city, and the New England township.

4. Woman in the Grecian tragic poets.
5. The policy of aggrandizement in Nations.
6. The best representatives of the Hellenic spirit.
7. The political issues of the future.
8. Schiller's ode, "The Ideal and Life."
9. The constructive character of our age.
10. The perpetuity of the Greek and Latin languages.
11. Edmund Burke as a political philosopher.
12. The moral nature as the source of true oratory.
13. The peasant insurrections of the Middle Ages, and the modern "strike."
14. The imagination in science.
15. The requisites in a work of art.

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an *auditing* committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1879-80.

President—S. F. BELKNAP, '73.

Vice-Presidents—C. F. HENDRYX, '69; J. L. MAXWELL, '70; J. E. MORE, '71; GEO. A. ISELIN, '72; L. G. BOIES, '73, E. O. RANDALL, '74; FRANK HISCOCK, '75; W. J. BERRY, '76; J. N. OSTROM, '77; R. H. TREMAN, '78.

Recording Secretary and Treasurer—W. R. LAZENBY, '74.

Corresponding Secretary—M. VAN CLEEF, '74.

Executive Committee—M. VAN CLEEF and W. R. LAZENBY, *ex officio*, and CLARENCE SMITH, H. R. DUDLEY, H. W. FOSTER.

Auditing Committee—G. B. TURNER, R. G. H. SPEED and J. S. COON.

Orator—L. G. BOIES, '73; Alternate, G. C. MOREHOUSE.

Poet—S. P. STURGES, '76; Alternate, C. F. ALLEN.

Essayist—IDA BRUCE, '76; Alternate, G. H. FITCH.

TRUSTEE ELECTED.

HON. S. D. HALLIDAY.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869, [8].

* The star denotes deceased graduates.

G. F. Behringer, A.B.
M. B. Buchwalter, A.B.
J. B. Foraker, A.B.
C. F. Hendryx, A.B.
J. Kirkland, A.B.
J. A. Rea, A.B.
D. W. Rhoades, A.B.
O. F. Williams, A.B.

GRADUATED IN 1870. [24]

A. A. Andrews, B.S.
*S. S. Avery, B.S.
J. S. Butler, B.S.
J. J. Chambers, Ph.B.
T. B. Comstock, B.S.
B. V. B. Dixon, A.B.
E. Douglas, A.B.
H. T. Eddy, C.E., (Ph.D., '72).
A. R. Greene, A.B.
S. D. Halliday, A.B.
E. D. Jackson, Ph.B.
H. V. L. Jones, Ph.B.
G. H. Lothrop, Ph.B.
G. M. Luther, B.S.
J. L. Maxwell, Ph.B.
P. Mosher, A.B.
C. J. Powers, B.S.
C. L. Powers, B. S.
E. F. Robb, A.B.
M. M. Ross, B.S.
P. G. Schoeder, Ph.B.
T. W. Spence, A.B.
C. A. Storke, A.B.
F. Walters, Ph.B.

GRADUATED IN 1871. [40]

W. S. Barnard, B.S.

L. H. Barnum, Ph.B.
G. A. Benton, A.B.
P. C. J. De Angelis, A.B.
A. B. Doerflinger, B.C.E.
A. H. Edgren, Ph.B.
W. Farnham, B.C.E., (C.E., '74).
A. N. Fitch, Ph.B.
O. Gillett, B.C.E.
E. J. Hadley, B.S.
W. H. Hayes, B.S.
* I. Hoagland, B.S., (Ph.B., '72).
S. F. Huntley, B.S.
K. W. Ingham, Ph.B.
G. W. Ingraham, A.B.
M. Kasson, B.V.S.
R. O. Kellogg, Ph.B.
E. D. Leffingwell, B.S.
J. J. Lockhart, B.S.
J. M. McNair, B.S.
W. S. McGregor, B.S.
J. E. More, A.B.
M. J. Morse, Ph.B.
J. O'Neill, A.B.
E. L. Parker, A.B.
C. E. Reeves, B.S.
F. H. Remington, B.S.
A. J. Rogers, Ph.B.
W. P. Ryman, B.S.
S. W. Salmon, B.C.E.
F. Schoff, B.C.E.
A. H. Sewell, B.S.
F. Sherman, B.S.
G.L.T. Smith, B.C.E., (C.E. '74).
M. A. Smith, B.C.E.
R. G. H. Speed, Ph.B.
R. Taft, B.S.
W. H. Tallmadge, A.B.
C. E. Van Cleef, B.S.
W. De L. Wilson, A.B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph.B.
M. C. Bean, B.C.E.
C. H. Blair, A.B., (A.M., '76).
D. W. Bowman, B.C.E.
E. L. Brady, B.S.
G. F. Breed, Ph.B.
H. S. Buffum, B.S.
J. M. Chase, B.S.
I. E. Clark, B.C.E.
A. C. Clement, B.S.
A. W. Clinton, B.S.
D. Colburn, B.C.E.
M. T. Conklin, B.S.
*H.E.Copeland,Ph.B.,(M.S.,'75).
C. L. Crandall,B.C.E.,(C.E.,'76).
C. S. Crofoot, Ph.B.
Gram Curtis, B.C.E.
D. M. Darrin, B.S.
L. A. Foster, B.S.
F. W. Frost, B.C.E.
A. N. Fuller, B.S.
W. Harkins, B.S., (B. Lit., '73).
R. Headley, B.S.
H. C. Henderson, B.C.E.
I. N. L. Heroy, B.S.
W. E. Holcomb, B.S.
F. Holden, A.B.
R. B. Howland, B.C.E.
J. H. Hurd, B.S.
E. W. Hyde, B.C.E., (C.E., '74).
G. A. Iselin, B.S.
D. S. Jordan, M.S.
L. F. Judson, B.S.
M. Kellogg, B.S.
J. B. Lawrence, Ph.D.
W. N. B. Lawton, Ph.B.
W. B. Leach, B.S.
J. W. Mack, B.S.
J. T. McCollum, B.S.
T. J. McConnon, B.S.
E. E. McElroy, B.S.
F. D. Nash, B.S.
E. Nicoll, B.S.
W. H. Niles, B.S.
A. Osborn, A.B.
D. M. Page, B.S.
M. G. Peters, B.S.
A. C. Pike, B.S.
G. W. Pitts, B.S.
* H. G. Pollock, B.S.
C. S. Price, B.C.E.
A. L. Rader, Ph.B.
A. Rogers, B.C.E.
D.E. Salmon,B.V.M.,D.V.M.,'76.
T. Sanderson, A.B.
W. I. Scott, B.S.

G. P. Serviss, B.S.
C. B. Sill, B.C.E.
*C. Smith, B.S.
L. P. Smith, B.S., (Ag.B., '74).
M. G. Stolp, B.C.E.
S. P. Thomas, B.C.E.
J. E. Van De Carr, B.S.
J. De W. Warner, Ph.B.
A. C. Weeks, B.S.
S. N. Williams, B.C.E.
E. V. Wilson, B.S.
T. H. Wolford, B.S.
W. J. Youngs, B.S.

GRADUATED IN 1873. [95].

C. F. Allen, B.C.E.
H. Altman, B.S.
R. Anderson, B.M.E.
J. C. Averill, B.S.
A. B. Aubert, B.S.
R. Bacon, B.S.
E. Bartley, B.S.
S. F. Belknap, B.S.
H. E. Blake, B.C.E.
L. G. Boies, A.B.
J. W. Boothby, B.S.
S. W. Brown, B.S., (C.E.,'76).
Frank Carpenter, B.C.E.
F. H. Carver, B.S.
A. B. Cauldwell, B.S.
J. Chamberlin, B.S.
I. P. Church, B.C.E.
J. T. Cothran, A.B.
W. H. Denham, B.S.
O. A. Derby, B.S., (M.S.,'74).
G. Devin, B.C.E.
*E. T. Diefendorff, B.S.
E. G. Donaldson, B.Lit.
G. F. Dudley, B.S.
W. F. Duncan, B.S.
E. S. Eastman, Ph.B.
L. Elsbree, A.B.
L. Everett, B.S.
J. B. Ewell, B.S.
L. Falkenau, B.C.E., (C.E.,'77).
F. B. Ferriss, B.S.
P. D. Finnegan, A.B.
C. Finster, A.B.
N. K. Foster, B.S.
J. Frankenheimer, Ph.B.
*M. R. Frazer, A.B.
A. Gridley, B.S.
F. N. Hagar, A.B.
F. W. Halsey, B.S.
G. W. Harris, Ph.B.
A. C. Harwick, B.S.
J. W. Hill, B.M.E.
G. W. Horner, B.C.E.
E. M. Howard, B.S.
A. T. Hyde, B.C.E.
H. C. Johnson, A.B.
*F. H. Jones, B.Lit.
C. S. Joy, A.B.
F. W. Kelley, A.B., (Ph.D.,'74).
W. L. Klein, B.S.
F. J. Knight, B.C.E.
J. M. Knowles, B.S.
*D. E. Kohler, A.B.
C. Y. Lacy, Agr.B.
C. F. Lane, A.B.
D. T. Lawson, B.C.E.
W. Leland, B.S.
C. E. Lipe, B.M.E.
R. H. Lockwood, B.C.E.
G. F. Lyman, B.C.E.
D. W. J. Mesick, B.S.
J. L. Moffatt, B.S.
J. G. Moore, A.B.
G. C. Morehouse, B.S.
W. T. Morris, B.S.
J. G. Newkirk, A.B.
C. D. Page. B.S.
R. Parmely, B.S.
F. Parson, B.C.E.
G. E. Patrick, B.S., (M. S.,'74).
G. H. Phelps, B.S.
A. H. Phinney, (B.S.), Ph.D.
*K. Preston, B.C.E.
F. W. Proctor, B.S.
F. J. Root, B.C.E.
J. R. Schoonover, Arch.B.
E. H. Scofield, A.B.
J. F. Seybolt, B.S.
M. C. Sharp, Ph.B.
M. A. Shotwell, Ph.B.
C. D. W. Smith, B.S.,(M.S.,'75).
C. L. Smith, B.S.

S. Smith, B.S.
W. H. Smith, A.B.
H. L. Sprague, B.S.
W. L. Sprague, A.B.
H. D. Stevens, B.S.
*G. A. Tilley, B.C.E.
W. Tinning, B.S.
*J. H. Tompkins, B.C.E.
G. B. Turner, B.S.
M. W. Van Auken, A.B.
C. F. Wheelock, B.S.
T. S. White, B.C.E.
T. Worthington, Ph.B.

GRADUATED IN 1874. [64].

F. B. Alexander, B.C.E.
G. Berry, Arch.B., (Arch.,'76).
N. W. Cady, Ph.B.
C. W. Candee, B.S.
J. D. Case, B.S.
J. F. Cluck, A.B.
J. H. Comstock, B.S.
F. W. Cooper, Arch.B.
O. H. P. Cornell, C.E.
J. A. Dobroluboff, B.C.E.
W. R. Dudley, B.S., (M.S.,'76).
H. L. R. Fairchild, B.S.
W. R. Fitch, B.C.E.
S. P. Fleming, A.B.
W. H. Flint, A.B.
R. B. Foster, B.C.E., (C.E.,'77).
L. M. Fulton, B.S.
W. Green, B.C.E.
H. M. Gillett, B.S.
T. Hampson, Lit.B.
J. T. Hay, B.S.
B. A. Hayes, Lit.B.
L. T. Henderson, Ph.B.
H. M. Hibbard, B.C.E.
H. L. House, A.B.
J. T. Hurd, B.S.
W. H. Janney, B.C.E,
E. F. P. Jordao, B.C.E.
W. A. Kellerman, B.S.
H. M. Kennedy, Lit.B.
B. W. Law, Arch.B.
C. H. Lay, B.C.E.
W. R. Lazenby, Agr.B.
H. G. Northrup, B.C.E.
J. H. Peirce, B.S.
E. M. Pitts, B.S., (M.S.,'75).
C. A. Preston, B.S.
C. H. Ramsay, B.S.
E. O. Randall, Ph.B.
W. M. J. Rice, Arch.B.
H. B. Robinson, B.C.E.
B. E. Shear, Arch.B.
G. S. Sheppard, B.S.
W. M. Smith, B.S.
W. N. Smith, B.M.E.
C. W. Soulby, B.S.
J. H. Southard, B.S.
A. C. Standart, B.S.
J. L. Stone, Agr.B.
W. Swaty, B.S.
W. P. Thompson, B.S.
L. P. Tier, B.C.E.
S. E. Todd, Arch.B.
F. C. Tomlinson, B.C.E.
G. B. Upham, B.S.
J. D. Upham, B.S.
M. Van Cleef, B.S.
G. R. Van De Water, B.S.
C. W. Wasson, B.C.E.
F. W. Warthorst, B.C.E.
R. H. Wiles, B.S.
G. T. Winston, Lit.B.
C. C. Wood, B.S.
F. C. Wood, B.S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph.B.
A. A. Beattie, B.M.E.
H. P. Bellows, B.S., (M.S.,'79).
E. T. Betts, B.S.
A. R. Bradford, B.S.
A. W. Bulkley, Arch.B.
S. J. Bunting, B.M.E.
C. F. Burt, B.S.
S. W. Carpenter, Ph.B.
I. N. Cook, B.C.E.
E. Corson, B.S.
V. L. Davey, A.B.
J. W. Dean, B.S.
O. W. Ferguson, B.C.E.
G. H. Fitch, B.S.

E. L. B. Gardiner, B.M.E.
E. George, B.C.E.
A. R. Gillis, B.M.E.
A. C. Greene, B.C.E.
C. S. Harmon, B.S.
O. Harris, B.S.
F. Hatch, A.B.
F. H. Hiscock, A.B.
D. R. Horton, B.S.
I. E. Hutton, Arch.B.
E. Jackson, B.S.
C. C. King, Arch.B.
H. B. Knight, A.B.
M. H. Ladd, A.B.
M. D. Makepeace, B.C.E.
G. S. Moler, B.M.E.
J. T. Newman, Ph.B.
E. L. Nichols, B.S.
P. H. Perkins, B.C.E.
E. D. Preston, B.C.E.
E. J. Preston, B.S.
H. H. Roberts, Ph.B.
E. K. Rossiter, Arch.B.
H. W. Sackett, A.B.
A. F. Shaw, B.S.
F. W. Simonds, B.S., (M.S.,'76).
F. P. Smith, B.S.
F. P. Stevens, B.S.
W. M. Sturges, Agr.B.
G. Tatnall, B.C.E.
J. J. Thomas, A.B., (A.M.,'76).
G. R. Thompson, B.S.
W. J. Thompson, B.S.
D. J. Tompkins, Ph.B.
V. S. Walsh, B.S.
F. P. Wheeler, B.S.
J. Worthington, A.B.

GRADUATED IN 1876. [65].

J. M. Ashley, B.S.
C. P. Aylen, B.C.E.
C. Barclay, B.S.
C. P. de Barros, B.C.E.
W. J. Berry, A.B.
G. Boardman, B.M.E.
C. T. Brewer, Ph.B.
J. T. Brown, B.M.E.
F. de A. V. Bueno, B.C.E.
J. K. Cady, Arch.B.
C. F. Carpenter, B.M.E.
E. F. Church, B.M.E.
M. R. Conable, B.C.E.
C. B. Coon, B.S.
S. H. Coon, A.B.
E. L. Crandall, B.S.
S. S. Eddy, B.S.
*A. F. Eidlitz, B.C.E.
C. H. Esty, A.B.
W. F. Farmer, B.C.E.
D. F. Flannery, B.S.
C. W. Foote, A.B., M.A., (Ph. D.,'77).
A. W. Foster, A.B., M.A.
E. Frayer, A.B., (A.M.,'77).
M. M. Garver, B.S.
H. McC. Hadley, Arch.B.
F. E. Heath, B.S.
A. Z. Kent, B.M.E.
W. H. Kent, B.S.
F. Looney, B.S.
A. E. Maltby, B.C.E.
W. G. McDowell, A.B.
J. C. McMullen, B.S.
R. L. Moore, B.S.
F. W. Noyes, Ph.B.
L. B. Palmer, B.S.
W. H. Parker, Arch.B.
C. R. Parkhurst, B.S.
J. Parmelee, B.S.
C. W. Raymond, B.C.E.
H. J. Rice, B.S.
W. K. Roy, B.S.
H. A. Rueppele, B.S.
H. Russel, A.B.
C. F. Saunders, Arch.B.
H. B. Seeley, Arch.B.
H. H. Seymour, B.S.
T. Stanton, A.B., (A.M.,'77).
J. H. Stubbs, B.C.E.
J. W. Sturdevant, B.S.
S. P. Sturges, A.B.
W. P. Sturges, B.S.
J. B. Tarleton, Arch.B.
*F. E. Taylor, B.M.E.
H. Terry, B.S.
E. D. Thompson, B.C.E.
H. C. Tilden, B.Lit.

C. A. Van Velzer, B.S.
E. A. Wagner, B.S.
C. E. Washburne, Ph.B.
C. B. Wheelock, B.C.E.
C. H. Willmarth, Agr.B., (M.S., '77).
C. P. Woodruff, B.S.
R. Yatabe, B.S.
F. O. Young, B.S.

GRADUATED IN 1877. [70].

W. C. Ames, B.C.E.
J. Aylen, B.C.E.
A. F. Balch, Arch.B.
C. M. Bean, Agr.B.
J. B. Beatty, B.S.
W. E. Bramhall, B.C.E.
Ida Bruce, A.B.
A. S. Carman, B.S.
P. D. Clark, Ph.B.
C. S. Cobb, B.S.
C. M. Cooper, B.S.
J. S. Coon, B.M.E.
F. D. Crim, B.S.
W. L. Deming, Arch.B.
W. E. Dennis, B.S.
W. R. Dobbyn, Lit.B.
L. Eidlitz, B.M.E.
H. W. Foster, A.B.
A. E. Frota, B.C.E.
S. H. Gage, B.S.
W. Gentleman, B.S.
W. S. Gifford, B.S.
G. W. Gillett, Ph.B.
B. H. Grove, A.B.
M. E. Haviland, B.S.
F. B. Hine, B.S.
L. O. Howard, B.S.
D. W. King, Arch.B.
W. E. Lape, B.M.E.
A. J. Loos, B.S.
W. E. Lucas, Ph.B.
D. J. Macpherson, B.C.E.
C. B. Mandeville, B.S.
L. M. Mann, B.C.E.
A. B. McNairy, B.M.E.
T. L. Mead, B.C.E.
J. S. Milford, B.S.
D. C. Moraes, B.C.E.
C. T. Mould, Arch.B.
I. H. Myers, B.S.
E. O'Niel, Ph.B.
J. N. Ostrom, B.C.E.
F. Outerbridge, B.M.E.
E. H. Palmer, B.S.
F. Patrick, Ph.B.
T. B. Peck, Arch.B.
F. M. Pennock, Agr.B.
H. Russel, (A.B.) Arch.B.
F. V. D. Sanford, B.S.
E. J. Sellew, A.B.
E. D. Sherman, B.S.
W. J. Sherman, B.C.E.
M. J. Sinton, B.S.
E. R. Smith, B.C.E.
S. M'K. Smith, Ph.B.
J. C. H. Stevenson, Ph.B.
H. Thomas, B.C.E.
M. C. Thomas, A.B.
W. B. Throop, B.C.E.
A. S. Tibbets, B.C.E.
H. H. Tyndale, B.S.
E. M. Van Dusen, Lit.B.
D. F. Van Vleet, B.S.
J. Viegas-Munis, B.C.E.
A. L. K. Volkman, Arch.B.
E. L. Ware, B.M.E.
J. S. Waterman, B.M.E.
F. P. Weeks, B.S.
H. S. White, B.S.
C. F. Wilson, Ph.B.

GRADUATED IN 1878. [67].

C. W. Ames, Lit.B.
J. W. Babcock, A.M.
E. Baker, B.S.
F. Baker, B.S.
A. H. Ballard, B.S.
S. T. Ballard, B.S.
P. Barnard, B.S.
W. Beahan, B.C.E.
A. E. Beardsley, B.S.
F. E. Bissell, B.C.E., (C.E., '79)
J. M. Borden, B.M.E.
F. Bruen, B.C.E.
E. Burdsall, B.M.E.

D. W. Cady, A.B.
E. Carey, B.S.
H. Conant, B.S.
C. Crandall, B.S.
S. G. Dewsnap, B.S.
B. B. DeWitt, A.B.
J. Dyson, B.C.E.
G. P. Eaton, B.S.
C. B. Everson, B.S.
A. Falkenau, B.C.E.
L. J. Giddings, B.S.
E. Green, Arch.B.
F. A. Halsey, B.M.E.
E. Hayes, B.C.E.
F. Heermans B.M.E.
M. Hicks, A.B.
J. T. Hill, B.M.E.
G. M. Jarvis, B.C.E.
B. Johnson, B.M.E.
L. F. Jones, B.S.
W. Keith, B.S.
F. M. Kendall, B.S.
J. S. Lehmaier, Ph.B.
F. W. Mann, B.S.
D. Marx, B.C.E.
F. A. Maxwell, B.C.E.,(C.E.,'79).
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K. McEbright, A.B.
W. L. McKay. A.B.
F. O. Meeker, B.S.
T. D. Merrill, B.C.E.
J. Ness, B.S.
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W. B. Pattin, B.S.
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E. L. Preston, B.C.E.
R. Putnam, Lit.B.
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C. M. Rexford, A.B.
Q. N. Ribiero, Arch.B.
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A. C. de Vasconcellos, B.M.E.
A.L.K.Volkmann, Arch.B., A.B.
A. C. Wakeley, Lit.B.
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P. H. Welker, B.C.E.
W. J. Wilcox, B.M.E.

GRADUATED IN 1879. [68].

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W. Chandler, B.S.
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W. Newton, B.S.

W. Olney, B.C.E.
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W. B. Philipp, B.S.
M. M. Pitcher, A.B.
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E. C. Russel, A.B.
S. J. Russel, Lit.B.
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F. H. Severance, B.S.
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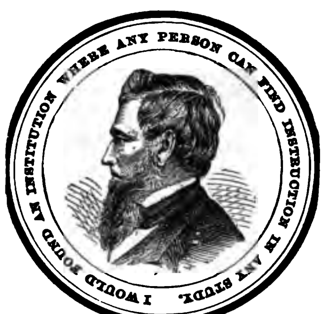
F. A. Wright, Arch.B.
J. H. W. Young, B.S.

THE

CORNELL UNIVERSITY

REGISTER

1880-81



ITHACA, N. Y.
PUBLISHED BY THE UNIVERSITY
1881

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CONTENTS.

INTRODUCTION.

Foundation of the University.

THE existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts." Thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of this State incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that it should give instruction in branches relating to Agriculture, Mechanic Arts, and Military Tactics; and that it should receive, without charge for tuition, one student annually from each Assembly District. Mr. Cornell fulfilled the first requirement of the Charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture. He also made, afterwards, many other generous gifts to the University.

The Act of Incorporation satisfies the condition of the Congressional grant by providing for instruction in such branches of learning as are related to Agriculture and the Mechanic Arts, and in Military Tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the Trustees may deem useful and proper."

The University, organized in accordance with these requirements of its charter, was duly opened on the seventh of October, 1868.

Trustees.

The number of Trustees, when the Board is complete, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a Trustee, and seven others, The President of the University, The Governor of New York, The Lieutenant Governor, The Speaker of the Assembly, The Superintendent of Public Instruction, The President of the State Agricultural Society, The Librarian of the Cornell Library.

Of the remaining fifteen two are elected annually by the Trustees and one by the Alumni.

The Faculty.

The Faculty, consisting of professors, resident and non-resident, and assistant professors, is assisted by special instructors and non-resident lecturers. It is divided into the following Special Faculties: Agriculture; Architecture; Chemistry and Physics; Civil Engineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters.

Special Features.

Some of the special features of the University may be briefly stated, as follows:

1. The employment of non-resident professors and lecturers.

2. Liberty in the choice of studies. The student can make his selection from several courses that have been carefully arranged; or he may form for himself an entirely independent

course subject to the approval of the Faculty; or he may de-devote himself, as a special student, to a single department of study. The Faculty, however, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to restrain inexperienced students from selections that can only be disadvantageous.

3. The liberal provision made for instruction in those branches of learning that relate to industrial pursuits, and the practical bearing given to the studies in all departments. The variety of instruction enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life.

State Students.

The ninth paragraph of the original Act of Incorporation of the University provides for the admission of one student, annually, from each Assembly District without payment of tuition. The number thus received, if all the scholarships were filled, would be five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies of the State. It is the duty of the School Commissioners or Board of Education to give the members of the public schools under their care the opportunity of competing. No applicant is allowed to compete who has been admitted to the University; and in order to enter the University, the successful candidate is subject to the same requirements in regard to scholarship as any other applicant. As the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition.

Resident Graduates.

The University does not contemplate any immediate movement in the direction of founding professional schools in Divinity, Law, or Medicine; but it has provided for the wants of those who have taken their first or Baccalaureate Degree, and wish to continue general studies or those subsidiary to scientific and professional pursuits. For such purposes its Library, Museums, Laboratories, and Lecture-rooms are open to its own graduates and graduates of like standing from other colleges and universities.

Advanced Degrees have been provided for these students, which, however, can be taken only on condition that the preparatory work has been fully and faithfully performed. Any student intending to take an advanced degree must announce his intention immediately on becoming a Resident Graduate, and place himself under the advice of the appropriate professor or special faculty. It is not necessary, however, that each student pursuing graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any branch of study and investigation.

Higher Education of Women.

It was the wish, from the first, of the Founder and other influential friends of the University, that it should be open to all, without regard to sex, color, or nationality. By an act of the Trustees, passed in April, 1872, women are admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building, the Sage College, offers a residence for those who prefer to live together rather than in private families. There is no separate course or department for women students, the entrance examinations and all the studies, except Military Science, being the same for them as for the young men.

Religious Instruction.

The University, established by a government which recognizes no distinctions in religious belief, would be false to its trust were it to seek to promote any creed, or to exclude any. The State of New York, in designating it as the recipient of the bounty of the United States Government, acted on this principle. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments in the University, and it is expressly ordered that "at no time shall a majority of the board of Trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of Henry W. Sage—religious services are held, and discourses delivered by representative clergymen of the various Christian denominations.

CALENDAR.

First Term, 1880.

September 14,	*Tuesday,*	Entrance Examinations begin.
September 16,	*Thursday,*	Registration Day.
September 17,	*Friday,*	Instruction begins.
November 25,	*Thursday,*	THANKSGIVING.
December 13,	*Monday,*	Term Examinations begin.
December 17,	*Friday,*	Term ends.

Second Term, 1881.

January 4,	*Tuesday,*	Entrance Examinations begin.
January 6,	*Thursday,*	Registration Day.
January 7,	*Friday,*	Instruction begins.
January 11,	*Tuesday,*	FOUNDER'S DAY.
February 22,	*Tuesday,*	WASHINGTON'S BIRTHDAY.
March 4,	*Friday,*	Woodford Prize Competition.
March 21,	*Monday,*	Term Examinations begin.
March 25,	*Friday,*	Term ends.

Third Term, 1881.

April 2,	*Saturday,*	Registration Day.
April 4,	*Monday,*	Instruction begins.
May 16,	*Monday,*	Commencement Essays presented.
May 25,	*Wednesday,*	Theses for Advanced Degrees presented.
May 30,	*Monday,*	DECORATION DAY.
May 31,	*Tuesday,*	Senior Examinations begin.
May 31,	*Tuesday,*	Examinations for Second Degrees begin.
June 6,	*Monday,*	Term Examinations begin.
June 10,	*Friday,*	Term Examinations end.
June 13,	*Monday,*	Entrance Examinations at Ithaca begin.
June 14,	*Tuesday,*	Entrance Examinations at Chicago, Cleveland, and Boston begin.
June 14,	*Tuesday,*	Class Day.
June 15,	*Wednesday,*	Alumni Day. Annual Meeting of the Trustees.
June 16,	*Thursday,*	COMMENCEMENT.

First Term, 1881.

September 13,	*Tuesday,*	Entrance Examinations begin.
September 15,	*Thursday,*	Registration Day.
September 16,	*Friday,*	Instruction begins.

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Humphrey, Charles, B.S.,		*Natural History*
Jonas, Albert, B.S.,		*History and Political Science*
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Webster, Hosea, B.S.,		*Mechanic Arts*
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Neymann, Olga,	New York City,	*Literature*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Ostrander, Will Sterling,	Schuylerville,	*Science and Letters*
Otis, Hanna Wood,	Sherwood,	*Science and Letters*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Place, Ira Adelbert,	Alfred Centre,	*Arts*
Read, Jesse Edwin,	Greenpoint,	*Engineering*
Rich, Fred William,	West Potsdam,	*Science*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Schumm, George,	San Francisco, Cal.,	*Science and Letters*
Shinkel, John Newton Dexter,	Rochelle, Ill.,	*Science and Letters*
Shiras, George,	Pittsburg, Pa.,	*Sc. and Letters*
Shnable, Emile Ralph,	Chicago, Ill.,	*Engineering*
Simmons, Parke Edmund.	Clarence, Iowa,	*Arts*
Smith, Edward Sholl,	Canajoharie,	*Science and Letters*
Smith, Raymond Lee,	Ithaca,	*Science and Letters*
Smith, Theobald,	Albany,	*Philosophy*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Stearns, James Brainard,	Rouse's Point,	*Arts*
Storey, William,	Rochester,	*Engineering*
Studley, Duane,	South Byron,	*Science*
Teague, Clara Louisa,	Caribou, Me.,	*Science and Letters*
Thompson, Erwin William,	Smithville, Ga.,	*Mechanic Arts*
Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Pelt, Gertrude Wyckoff,	Trumansburg,	*Science and Letters*
Vaughan, Edward Gilpin,	Richmond, Ind.,	*Sc. and Letters*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Wick, Richard Brown,	Pittsburg, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*

Wilson, Frank Thomas,	Corry, Pa.,	*Science and Letters*
Winegar, Harry Philips,	San Francisco, Cal.,	*Optional*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
*Withington, Alfreda Bosworth,	South Amboy, N. J.,	*Arts*

Juniors.

Adams, John Davis,	Plainville,	*Literature*
Ayers, Mary Frances,	Ithaca,	*Literature*
Baker, Clarence Albert,	Yaphank,	*Medical Preparatory*
Beebe, George,	Penn Yan,	*Science and Letters*
Biscoe, Helen Maria,	Keene, N. H.,	*Hist. & Polit. Sc.*
Blachstein, Arthur,	New York City,	*Med. Preparatory*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown, Ellen Coit,	Ithaca,	*Science and Letters*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	Brooklyn,	*Agriculture*
Buckland, Benjamin Isaac Coman,	Port Byron,	*Med. Preparatory*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carpenter, Calvin,	Troy,	*Hist. & Polit. Sc.*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chester, Frederick Dixon,	St. Louis, Mo.,	*Sc. and Letters*
Coe, Alfred Byron,	Oswego,	*Science and Letters*
Cole, Chester Glen,	Corning,	*Literature*
Collins, Homer,	Rochester,	*Natural History*
Corbett, Flora Josephine,	Clayville.	*Arts*
Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Cowles, Alfred Hutchinson,	Cleveland, O.,	*Chem. & Physics*
Curtis, Ida Maynard,	Boston, Mass.,	*Sc. and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fay, Lewis George,	Burlington,	*Arts*
Fowler, Mary,	Gouverneur,	*Science and Letters*
Gardiner, William Frederick,	Fort Covington,	*Med. Preparatory*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*

Harding, William Elias,	Bethany,	*Agriculture*
Hiscock, Albert King,	Syracuse,	*Arts*
Holman, Julian,	Bolton, Mass.,	*Agriculture*
Horr, Norton Townshend,	Wellington, O.,	*Sc. and Letters*
Horr, Rollin Cortland,	Wellington, O.,	*Sc. and Letters*
Kenney, Eudorus Catline,	Truxton,	*Mathematics*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Krüsi, Hermann,	Oswego,	*Engineering*
Leary, Frank,	Ithaca,	*Science and Letters*
Luckey, Frank Ranney,	Poughkeepsie,	*Sc. and Letters*
Lyon, John,	Schuylerville,	*Hist. & Polit. Sc.*
McClelland, Robert Watson,	Pittsburg, Pa.,	*Sc. and Letters*
Oatley, Eugene Lyman,	Utica,	*Medical Preparatory*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*
Purdy, Markwell Seward,	Corning,	*Philosophy*
Putnam, Mary Chastina,	Ellington,	*Literature*
Rackemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walker Glazier,	Minetto,	*Science and Letters*
Reed, Charles,	Senaju, Guatemala,	*Sc. and Letters*
Reed, Jared Ackerson,	Ontario,	*Science and Letters*
Robie, Harry Adams,	Marathon,	*Mechanic Arts*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Rœhrig, Fred Lewis,	Ithaca,	*Architecture*
Sazé, Hidesabro,	Wahamatsu, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Natural History*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Sc. and Letters*
Smith, Hermon Woodworth,	Trumansburg,	*Science and Letters*
Smith, Isaac Parshall,	Ithaca,	*Arts*
Smith, Joseph Lesley,	Canajoharie,	*Science and Letters*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Streeter, Howard Malcom,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Mechanic Arts*
Thompson, Madeleine Sylvester,	Passaic, N. J.,	*Sc. and Letters*
Trumbull, William,	Sandy Hill,	*Engineering*
Tuthill, James Fred,	Corning,	*Arts*
Van Pelt, Elizabeth Vredenburgh,	Trumansburg,	*Sc. and Letters*
Van Rensselaer, John,	Ithaca,	*Arts*
Wait, John Cassan.	Norwich,	*Engineering*

Waldo, Gerald,	Scotland, Conn.,	*Agriculture*
Webster, John Gurdon,	Bath,	*Natural History*
Wilcox, Asa Stearns,	East Minneapolis, Minn.,	*Sc. and Letters*
Wilson, Dora Frank,	Ithaca,	*Science and Letters*
Woodard, James Allen,	Elma,	*Science and Letters*
Wright, George Herdman,	Buffalo,	*Arts*
Yeaw, Everett,	Lawrence, Mass.,	*Arts*

Sophomores.

Alling, Asa Alling,	Bangall,	*Science and Letters*
Anderson, Charles Henry,	Griggsville, Ill.,	*Literature*
Avery, Charles Irving,	Auburn,	*Science and Letters*
Avery, James Carrington.	Auburn.	*Science and Letters*
Ayres, Philip Wheelock,	Villa Ridge, Ill.,	*Optional*
Badger, Theodore,	Ithaca,	*Agriculture*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Baum, Josephine,	Syracuse,	*Science and Letters*
Beye, John Charles,	Elgin, Ill.,	*Science*
Biggs, Herman Michael,	Trumansburg,	*Arts*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Oil City, Pa.,	*Literature*
Boyer, Jerome Webster,	Freeport, Ill.,	*Agriculture*
Brainard, George Austin,	Higganum, Conn.,	*Sc. and Letters*
Brownell, Hart Murray,	Nyack,	*Engineering*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*
Burpee, George Herbert,	Sauquoit,	*Mechanic Arts*
Carson, William,	St. Paul, Minn.,	*Hist. & Polit. Sc.*
Chase, Charles Curry,	Schenevus,	*Literature*
Cobb, William Howard,	Andover,	*Agriculture*
Countryman, Charles Edwin,	Albany,	*Hist. and Polit. Sc.*
Crooker, Edward Henry,	Minneapolis, Minn.,	*Literature*
Curtis, Charles Locke,	Newfield,	*Arts*
Cushing, Edward Fitch,	Cleveland, O.,	*Philosophy*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dix, John Alden,	Glens Falls,	*Science*
Dowling, Eunice,	Bradford,	*Arts*
Duryea, Edwin,	Craigsville,	*Engineering*

Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moser,	Ithaca,	*Philosophy*
Ehrman, Harry,	Decatur, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Failing, Milton,	Rexville,	*Science and Letters*
Fraser, James,	Johnstown,	*Science and Letters*
Freeman, Walter Jackson,	Philadelphia, Pa.,	*Nat. History*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*
Handy, Ella Marie,	Schoharie,	*Optional*
Hoffman, Harry Natt,	Elmira,	*Optional*
Holton, Frederick Arthur,	Washington, D. C.,	*Chem. & Physics*
Humphries, John Henry,	Syracuse,	*Literature*
Ingersoll, George Talcott,	Cleveland, O.,	*Mechanic Arts*
Jacobs, Townsend Herbert,	Ithaca,	*Architecture*
Kelley, Charles Wallace,	Albany,	*Mechanic Arts*
Kerr, Milton Royce,	Mongaup Valley,	*Science*
Lillis, Thomas Francis,	Coventryville,	*Mechanic Arts*
Longwell, Harry Edgar,	Monongahela, City, Pa.,	*Mechanic Arts*
Mapes, Arlington,	Rushville,	*Optional*
Marshall, Holmes,	Cleveland, O.,	*Arts*
Matthews, Albert Franklin,	Orange, N. J.,	*Optional*
Maxwell, Emma Eliza,	North Clymer,	*Sc. and Letters*
McGraw, DeWitt Hiram,	Binghamton,	*Arts*
Nash, Horace Woodworth,	Ithaca,	*Medical Preparatory*
Odell, Albert,	Bloomville,	*Engineering*
Page, William Henry,	Stafford,	*Engineering*
Patterson, Roswell Henry,	Herrick Centre, Pa.,	*Sc. and Letters*
Payne, Lewis Taber,	Tonawanda,	*Sc. and Letters*
Pearson, Edward,	Sedalia, Mo.,	*Engineering*
Pease, Henry Hale,	Syracuse,	*Optional*
Place, Edwin,	Cincinnatus,	*Engineering*
Potter, Bina Abigail,	Ithaca,	*Optional*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Science and Letters*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science and Letters*
Raynor, George Cartwright,	Riverhead,	*Science and Letters*
Reed, James William,	Warrensburg,	*Engineering*

Root, Daniel Bayard,	Port Byron,	*Literature*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*
Rüdiger, John Max,	Brooklyn,	*Mechanic Arts*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*
Runyon, Frank Willets,	Plainfield, N. J.,	*Literature*
Searing, Byron Hudson,	Sherwood,	*Science*
Serat, Seth Swift,	Elmira,	*Science and Letters*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Shorter, Thomas Jay,	Aurora,	*Agriculture*
Smith, Delano Eugene,	New York City,	*Sc. and Letters*
Smith, John Campbell,	Cleveland, O.,	*Mechanic Arts*
Southwick, John Leonard,	Bombay,	*Science and Letters*
Stevenson, George Edward,	Clark's Green, Pa.,	*Agriculture*
Sullivan, Frank Robert,	Pompey Centre,	*Philosophy*
Sweet, Vaughn Charles,	Phœnix,	*Mechanic Arts*
Thayer, George Henry,	Plymouth, Ind.,	*Philosophy*
Tinsley, Henry Greenwood,	Lyons,	*Optional*
Tomkins, Walter,	Newark, N. J.,	*Sc. and Letters*
Turner, Ebenezer Tousey,	Ithaca,	*Engineering*
Washburn, Frank Sherman,	Chicago, Ill.,	*Engineering*
Welby, Arthur Adlard,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Wetherell, Jane Johnson,	Philadelphia, Pa.,	*Sc. and Letters*
Wheeler, William Murray,	Breesport,	*Philosophy*
Whitney, Harry Leroy,	Plymouth, Pa.,	*Sc. and Letters*
Wilcox, Fred Clarence,	Ithaca,	*Arts*
Wilcox, Fred Elmer,	Ithaca,	*Agriculture*
Woodruff, Cora Eliza,	Ithaca,	*Arts*
Yost, Florence Lincoln,	Corry, Pa.,	*Science and Letters*

Freshmen.

Aiken, George David,	Tioga, Pa.,	*Science and Letters*
Aldrich, Herbert Lincoln,	New York City,	*Literature*
Avila, Arao Ferreira de,	San Paulo, Brazil,	*Mechanic Arts*
Bassett, Emma Neal,	Cooper's Plains,	*Philosophy*
Bell, Maud,	Chester, N. H.,	*Optional*
Bering, Wilson Morrison,	Decatur, Ill.,	*Science and Letters*
Brewster, Charles Albert,	Addison,	*Science and Letters*

Brown, Julia Wells,	Holland Patent,	*Optional*
Burrows, James Bering,	Decatur, Ill.,	*Science and Letters*
Cahn, Benjamin Robert,	Chicago, Ill.,	*Optional*
Campbell, Daniel Alexander,	Fort Wayne, Ind.,	*Engineering*
Carmalt, Edward,	Punxsutawney, Pa.,	*Science and Letters*
Carpenter, Fred Wisner,	Owego,	*Engineering*
Carpenter, George,	Waverly, Pa.,	*Agriculture*
Carter, William Alexander,	Fort Bridger, W. T.,	*Hist. & Polit. Sc.*
Case, Howard Emmet,	Fulton,	*Science and Letters*
Cassedy, William Fraser,	Newburg,	*Philosophy*
Chisholm, Charles Fillmore,	Chazy,	*Optional*
Cobb, Alice Ellen,	Andover,	*Optional*
Coimbra, Anastacio Rodrigues de Aquino,	Trez Ilhas, Brazil,	*Mechanic Arts*
Cole, Edward Marcus,	Newnan, Ga.,	*Mechanic Arts*
Cole, Frank Barto,	Newnan, Ga.,	*Mechanic Arts*
Coles, Franklin Albert,	Glen Cove,	*Science and Letters*
Collmann, Onnie Janssen,	Freeport, Ill.,	*Science and Letters*
Coman, Charles Walter,	Kankakee, Ill.,	*Sc. and Letters*
Copley, Allen Enos,	Chaumont,	*Science and Letters*
Cornell, Ida,	Central Valley,	*Optional*
Cowles, Lewis Hutchinson,	Cleveland, O.,	*Philosophy*
Crandall, George Hazard,	Almond,	*Agriculture*
Curnow, George Trevilyan,	Brooklyn,	*Engineering*
Dann, Clarence Burdette,	New Haven, Conn.,	*Engineering*
Davidson, George Bruce,	Scranton, Pa.,	*Agriculture*
Davol, Joseph Benjamin,	Chicago, Ill.,	*Engineering*
DeForest, Harry Pelouze,	Fulton,	*Science and Letters*
Ditmars, George Ford,	Ovid Centre,	*Hist. and Polit. Sc.*
Drury, John Maynerd,	Vail's Mills,	*Science and Letters*
Du Bois, William,	Great Bend, Pa.,	*Mechanic Arts, Special*
Ensign, Orville Hiram,	Ithaca,	*Mechanic Arts*
Farrington, Charles Lincoln,	Trumansburg,	*Arts*
Fish, Fred Starr,	Cedarville,	*Science and Letters*
Freeman, William Neely,	Sherburne,	*Arts*
Gage, Maud,	Fayetteville,	*Literature*
Gambee, Linnie,	Ithaca,	*Science and Letters*
Gilbert, Sarah Hughes,	Buckingham, Pa.,	*Mathematics*
Goodman, Maurice Hugo,	Chicago, Ill.,	*Optional*

Grotecloss, Hattie Elizabeth,	New York City,	*Natural History*
Gwynne, Edmiston,	Columbus, O.,	*Sc. and Letters*
Haldeman, Frank Mackenzie,	Cleveland, O.,	*Chemistry, Special*
Hamilton, Alexander,	San Francisco, Cal.,	*Optional*
Hamilton, William Vallance,	Caledonia,	*Optional*
Hasbrouck, Charles Alfred,	Ithaca,	*Engineering*
Hettinger, Mathias,	Freeport, Ill.,	*Sc. and Letters*
Hillger, Samuel Ernest,	New Orleans, La.,	*Architecture*
Hoefler, John Lincoln,	Ilion,	*Mechanic Arts*
Horton, Howard Lispenard,	City Island,	*Science and Letters*
Howard, William Turner,	New York City,	*Sc. and Letters*
Howland, Herbert Slocum,	Sherwood,	*Architecture*
Hufcutt, Ernest Wilson,	Afton,	*Science and Letters*
Ingalls, Frank Percy,	Salem, Mass.,	*Chemistry and Physics*
Jones, Anna Lizzie,	Trumansburg,	*Philosophy*
Jones, Charles Sumner,	Middlesex,	*Science and Letters*
Knap, William Herschel,	Niantic, Ill.,	*Science and Letters*
Knowles, Wilbur Stoddard,	Pennington, N. J.,	*Arch., Special*
Krauss, William Christopher,	Attica,	*Science and Letters*
Lapham, Ludlow Eliakim,	Penn Yan,	*Arts*
Larned, William Henry,	Poland,	*Engineering*
Law, John Edwin,	Ithaca,	*Optional*
Levi, Louis Eleazer,	Buffalo,	*Chem. and Physics*
Lewis, George Washington,	Buffalo,	*Arts*
Linn, William Walton,	Decatur, Ill.,	*Science and Letters*
Maguire, Edward,	Seward,	*Science and Letters*
McLallen, James Grover,	Trumansburg,	*Science and Letters*
McLennan, Roderick,	Elgin,	*Philosophy*
McLoughlin, James,	New York City,	*Optional*
McMillan, Frank,	Buffalo,	*Hist. and Polit. Sc.*
Miller, Emily,	Waverly, Pa.,	*Science and Letters*
Monroe, Elmon,	Silver Creek,	*Arts*
Murphy, Edward Charles,	Phœnix,	*Engineering*
Norton, Charles David,	Elmira,	*Mechanic Arts*
Oakes, Helen Mar,	Steuben,	*Optional*
Olin, Fred,	Perry,	*Mechanic Arts*
Overton, Floyd Carter,	Belleville,	*Philosophy*
Paddock, Fred Gore,	Malone,	*Science and Letters*
Patchin, Frank Glines,	Wayland,	*Science and Letters*

Penny, George Barlow,	Haverstraw,	*Science*
Phelps, Henry Samuel,	Morrisville,	*Optional*
Potter, Charles Anson,	Alpine,	*Science and Letters*
Poucher, Warren Allen,	Oswego,	*Mechanic Arts*
Randolph, Cyrus,	Decatur, Ill.,	*Literature*
Reno, Robert Ross,	Harrisburg, Pa.,	*Engineering*
Robinson, Clarence Isaac,	Mt. Vision,	*Chem. and Physics*
Rose, Hudson Parmelee,	Cleveland, O.,	*Literature*
Russell, Ernest Emory,	Havana,	*Engineering*
Schwerdtfeger, Ernest,	Galveston, Tex.,	*Mechanic Arts*
Scofield, Frank Graham,	Fishkill,	*Engineering*
Seymour, Ralph Crysler,	Ogdensburg,	*Mechanic Arts*
Shaler, Ira Alexander,	New York City,	*Sc. and Letters*
Sibley, Herbert Delano,	Randolph,	*Optional*
Skillicorn, John Henry,	Albany,	*Natural History*
Sloan, Fred,	Worcester,	*Philosophy*
Smith, Charlotte,	Smith's Mills,	*Philosophy*
Smith, James Archibald,	Ithaca,	*Philosophy*
Spurr, Marcia Edith,	South Edmeston,	*Science and Letters*
Stambaugh, John Tod,	Youngstown, O.,	*Optional*
Story, Elmer Gildersleeve,	Schultzville,	*Science and Letters*
Taber, Lucretia Hathaway,	New Bedford, Mass.,	*Arts*
Thorp, Charles Monroe,	Oil City, Pa.,	*Philosophy*
Vaughan, James Frye,	Springville,	*Optional*
Van Dusen, Gertrude Frances,	Geneva,	*Arts*
Van Ostrand, Byron Dean,	Marion,	*Science and Letters*
Van Sickle, John,	Cayuga,	*Optional*
Walch, Charles John,	Syracuse,	*Science and Letters*
Ware, Richard,	Washington, D. C.,	*Optional*
Waring, John,	Ovid,	*Mechanic Arts*
Webb, Walter Loring,	Cortland,	*Engineering*
Weed, Oscar Dillwyn,	North Rose,	*Arts*
Welles, Nelson Ackley,	Elmira,	*Agriculture*
Wheeler, Amos,	Ithaca,	*Optional*
Williams, Timothy Shaler,	Ithaca,	*Arts*
Wilson, Charles Bundy,	Geddes,	*Arts*
Wilson, Edward Fay,	Ithaca,	*Agriculture*
Wisewell, Frank Wilson,	Ithaca,	*Mechanic Arts, Special*
Wright, Horton,	Hoosick Falls,	*Science and Letters*
Wyckoff, James Newton,	Perry,	*Optional*

Summary by Years.

Resident Graduates	14
Seniors	89
Juniors	77
Sophomores	95
Freshmen	124
	399

Summary by Courses.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Agriculture	9	5	7	5	26
Architecture	1	2	2	3	8
Arts	19	13	10	10	52
Chemistry and Physics	—	1	1	4	6
Civil Engineering	10	4	12	12	38
History and Political Science	—	3	2	3	8
Literature	5	8	8	4	25
Mathematics	2	1	—	1	4
Mechanic Arts	4	3	12	14	33
Medical Preparatory	—	5	1	—	6
Natural History	3	3	1	2	9
Philosophy	4	3	5	10	22
Science	3	—	4	1	8
Science and Letters	28	25	22	35	110
Optional	1	1	8	20	30
Undergraduates	89	77	95	124	385
Resident Graduates					14
Total					399

ADMISSION.

Entrance Examinations.

I.

The Primary Examination for Admission to the University.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar*, including Orthography and Syntax.
2. In *Geography*, political and physical.
3. In *Physiology*.
4. In *Arithmetic*, including the Metric System; *Algebra*, through Quadratic Equations, and including Radicals and the Theory of Exponents; and *Plane Geometry*.

In place of these examinations Certificates or Diplomas are received as follows:

(*a*) *Regents' Certificates* issued by the Regents of the State of New York are accepted instead of the examinations in Arithmetic, Geography, and English Grammar.

(*b*) Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by those Academies and High Schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted instead of the examinations in all the subjects named above *except Algebra.*

(*c*) Diplomas issued by the Regents to graduates from the High Schools and Academies of the State of New York are accepted instead of the examinations in all the subjects named.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen*.

II.

Examinations for Admission to the Courses.

The requirements for admission to the Courses in *Agriculture*, *Architecture*, *Civil Engineering*, and *Mechanic Arts*, are the same as those for admission to the University ; but for admission to any of the other regular Courses of Study, the requirements, *in addition to the Primary Examination*, are as stated below.

To the Courses in Science, Science and Letters, Mathematics, and Chemistry and Physics.

In addition to the Primary Examination, an examination in *any one* of the following sets of subjects :

The principles of French Grammar, the translation of English into French, and three books of Voltaire's Charles XII, or its equivalent;

Or, The whole of Whitney's German Grammar, translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Or, Algebra entire (*any of the larger ones*), Solid Geometry, including Conic Sections, and Trigonometry, Plane and Spherical.*

* Treating the trigonometrical functions as ratios ; as in Todhunter, Peirce, Chauvenet, Wheeler, and Greenleaf.

To the Course in Natural History and the Two Years Course Preparatory to the Study of Medicine.

In addition to the Primary Examination, examinations as follows:

In French or German as above; in Plane Trigonometry; in Latin four books of Cæsar's Commentaries, or some equivalent, with an adequate amount of grammatical knowledge; and in Greek the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Courses in Literature and Philosophy.

In addition to the Primary Examination, examinations as follows:

In French, or German, or advanced Mathematics (as above), and in Latin (as below).

To the Course in Arts.

In addition to the Primary Examination, examinations in Greek and Latin.

I. Greek.—Candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read, (2) in translating easy Greek at sight, (3) in translating English into Greek, and (4) on the History of Greece, to the death of Alexander.

II. Latin.—Candidates are examined upon (1) the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic War, Virgil, the Eclogues and six books of the Æneid (with the prosody), Cicero, six Orations, including the four against Catiline; (2) the translation at sight of passages of average difficulty from Cæsar and Cicero; (3) the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's "Introduction to Latin Composition"; (4) the outlines of Roman History and Ancient Geography (Leighton's "History of Rome" will indicate the amount and method of study desired).

Admission to Special Departments.

Special Students are admitted without examination, by a vote of the Faculty, to any of the Departments in which either laboratory work or drafting is required, on the recommendation of the professor in charge of the department. Such students must be at least twenty-one years of age, and must have satisfactory attainments in the subject they intend to pursue; they are required to devote at least fifteen hours a week to the work of the department which they have entered, and to renew their application for admission at the end of each year.

Admission to Advanced Studies.

Candidates for admission to advanced studies in any course are required to pass, *in addition to the Entrance Examinations* for that course, examinations in the work already performed by the classes which they design to enter.

Candidates from Other Colleges.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examination* only, and when offered by those who *have passed at least one term's examinations* at the institution granting such dismissal. No person, whether from another college or not, is admitted to *advanced* studies except after examinations as above stated.

Admission to Graduate Study.

Students are admitted to graduate study after having taken a Baccalaureate degree in this University, or on presenting the diploma of any equivalent degree conferred elsewhere ; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the Library, Museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or a special faculty.

DEPARTMENTS AND SPECIAL COURSES OF STUDY.

AGRICULTURE.

I. *APPLIED AGRICULTURE.*

The requirements for admission to the Course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools.

The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture five hours weekly during the *Fourth Year* are devoted to technical instruction in all its leading and most of its minor branches. The students are also required to spend three hours a day, two days in each week, in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the *Fourth Year* and continues through three terms. First Term: Wheat, culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, and marketing; Swine, the history of breeds, feeding, diseases, general management, and piggeries; Farm Buildings, location plans, material, construction, repairs and preservation, contracts and liabilities of contractors; Fields, shape and size; Fences and Gates, construction, number, kind, repairs, and durability of woods used; Farm and Public Roads, bridges and culverts, location, construction, and repairs; Farms, their selection and purchase with regard to (1) remoteness or nearness to markets, (2) agricultural capabilities, (3) roads, (4) improvements, (5) schools and society, titles, deeds, judgments, and mortgages; Farm-yard Manures, their composition, manufacture, preservation, and application; Commercial Fertilizers, composition, application, and utility; Farm Accounts begun. Second Term: Farm Accounts completed; Principles of Stock-breeding, law of similarity, of variation as caused by food, habit, and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds, pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle. Third Term: The Horse, breeds and breeding, education, care, driving, and stables; Farm Drainage, mapping of drains, material, construction, and utility; Plows and plowing; Farm Implements and machinery, use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business Customs, rights, and privileges; Notes, contracts, and obligations; Employment, and direction of laborers.

The University Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of Agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments, are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largely devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. *AGRICULTURAL CHEMISTRY.*

The study of Agricultural Chemistry comprises lectures, and analytical practice in the laboratory. The lectures, one hundred and eleven in number, embrace the following general subjects :

The general principles of chemical science, accompanied by introductory laboratory practice; the chemistry of the elements and their compounds that constitute soils, plants, and animals; agricultural chemical investigators and their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, and water and air in their relations to human and animal life; the chemical analysis of fodder and food; and farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry, page 57.

III. *ECONOMIC ENTOMOLOGY.*

Twenty lectures upon this subject are given in the Third Term.

The course presents the characteristics of the orders of insects, the more important families, and the species which are injurious, beneficial, or otherwise especially interesting. The lectures are illustrated by specimens of the stages and works of insects, and due prominence is given to the practical treatment of forms having an economic importance.

In the laboratory and field practice students are instructed in all kinds of practical entomological work, involving drawings and notes of observations, with methods of collecting, breeding, destroying, preserving, arranging, etc.

IV. *HORTICULTURE.*

In this department lectures and recitations in the class-room are supplemented by practice in the laboratory, gardens, and orchards.

The instruction begins with the *Third Year* and continues three terms. The First Term is devoted to Fruit Culture and Forestry. The origin, history, botanical position, methods of propagation, cultivation, pruning and training, harvesting and marketing, varieties, etc., of both the small and large fruits are studied. In Forestry special attention is given to the influence of forests upon climate, the value of timber, and the best methods of culture.

In the Second Term a course of lectures is given on Vegetable Culture, including kitchen and market-gardening, and seed-growing. Among the subjects considered are: Location of the garden, laying out ground, grading, draining, special preparation of soil, irrigation, management of composts, commercial fertilizers, implements, selection of seed, construction and management of green-houses, hot-beds, cold-frames; special crops, history, cultivation and varieties of each; growing seeds for home use and for market; the family kitchen-garden, etc.

The Third Term is devoted to Floriculture, including landscape-gardening. The general subject is divided into the following topics: Window-gardening, general management of house plants, hanging-baskets, climbing vines, flowering bulbs, ferneries, Wardian cases, etc.; out-door flower-gardening, lawns, ornamental shrubs and trees, commercial flower-gardening.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces :

1. Five lectures a week during an entire academic year.

2. Laboratory work on the bones, clastic models, pathological preparations, and parasites of the domestic animals.

3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

The Second Term is devoted to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals, and of veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

The Courses in Agriculture.

I. A FOUR YEARS COURSE.

Leading to the degree of Bachelor of Agriculture.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; freehand drawing, 3; German *or* French, 5; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; freehand drawing, 3; German *or* French, 5; rhetoric, 2.

THIRD TERM.—General chemistry, practice and lectures, 3; German *or* French, 5; rhetoric, 2; trigonometry, 3; theory of equations, 2.

SECOND YEAR.

FIRST TERM.—Agricultural chemistry, 5; zoology, lectures and laboratory work (vertebrates), 3; anatomical practice, 2; German *or* French, 3; experimental mechanics *or* heat, 3.

SECOND TERM.—Agricultural chemistry, 4; chemical practice, qualitative analysis, 5; anatomical practice, 2; German *or* French, 3; electricity and magnetism, 3.

THIRD TERM.—Botany, lectures, 3, field work, 2; entomology, lectures, 2, practice, 2; German *or* French, 3; land surveying, 4.

THIRD YEAR.

FIRST TERM.—Compositæ and gramineæ, 2; practical horticulture, 3; entomology, 3; heat *or* experimental mechanics, 3; veterinary anatomy and physiology, 5.

SECOND TERM.—Vegetable physiology, 3; vegetable histology, 2; practical horticulture, 2; chemical practice, quantitative analysis, 4; veterinary pathology, sanitary science, and parasites, 5.

THIRD TERM.—Chemical practice, quantitative analysis, 9; veterinary medicine and surgery, 5; practical floriculture, 2.

FOURTH YEAR.

FIRST TERM.—Agriculture, lectures, 5; practice, 3 (Tuesday and Thursday afternoons); botany (fungi), 3, principles of horticulture, 2; geology, 3.

SECOND TERM.—Agriculture, lectures, 5; practice, 2 (Tuesday and Thursday afternoons); systematic and applied botany, 3; horticulture, 2.

THIRD TERM.—Agriculture, lectures, 3; practice, 3 (Tuesday and Thursday afternoons); building materials and construction, 2; American law, 5.

II. A THREE YEARS COURSE.

Not leading to a degree.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; agricultural chemistry, 5; chemical practice, 3; freehand drawing, 3.

SECOND TERM.—Agricultural chemistry, 4; chemical practice, 6; algebra, 5.

THIRD TERM.—Botany, lectures, 3, field work, 2; entomology, lectures, 2, practice, 2; trigonometry, 3; theory of equations, 2.

SECOND YEAR.

FIRST TERM.—Compositæ and gramineæ, 2; practical horticulture, 3; geology, 3; experimental mechanics, 3; veterinary anatomy and physiology, 5.

SECOND TERM.—Vegetable physiology, 3; vegetable histology, 2; practical horticulture, 2; chemical practice, 4; veterinary pathology, sanitary science, and parasites, 5.

THIRD TERM.—Practical floriculture, 2; chemical practice, 4; land surveying, 4; veterinary medicine and surgery, 5.

The third year is the same as the fourth year of the four years course.

For the requirements for admission to the Courses in Agriculture see page 31.

MECHANIC ARTS.

In 1870, the Honorable Hiram Sibley provided for the erection of a suitable building for the Department of Mechanic Arts. He also gave ten thousand dollars for increasing its furniture, and has since made a further gift of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering.

Closely connected with the lecture-rooms are the rooms for designing machinery, pattern-making, and the workshop—devoted solely to instruction in practical work. The shop-practice embraces work requiring the use of all hand-tools, and the machines employed in the ordinary machine-shops. The shop is provided with a number of superior tools capable of performing all varieties of work, with surface plates, standard gauges, and a standard measuring machine, to accustom the students to accurate workmanship.

Each student in the department is required to devote two hours a day to work in the shop, though such students as have, before entering, acquired sufficient practical knowledge are admitted to advanced standing. Attendance upon ten lectures or recitations a week, or their equivalent, in addition to two hours daily drawing, two hours daily shop-practice, and the passing of the examinations at the close of each term, are necessary to remaining in the department.

The Course in Mechanic Arts.

Leading to the degree of Bachelor of Mechanical Engineering.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French *or* German, 5; freehand drawing, 3; shop-practice, 3.

Second Term.—Algebra, 5; French *or* German, 5; freehand drawing, 3; shop-practice, 3.

Third Term.—Trigonometry, 3; theory of equations, 2; French *or* German, 5; descriptive geometry, 3, drawing, 1; shop-practice, 3.

SECOND YEAR.

First Term.—Analytical geometry, 5; German *or* French, 3; experimental mechanics *or* heat, 3; descriptive geometry, 4, drawing, 2; shop-practice, 3.

Second Term.—Calculus, 5; German *or* French, 3; chemical lectures, 3; electricity and magnetism, *or* metallurgy, 3; shop-practice, 3.

Third Term.—Calculus, 5; German *or* French, 3; electricity and magnetism, *or* machine construction, 3; chemical lectures, 3; shop-practice, 3.

THIRD YEAR.

First Term.—Calculus, and analytical geometry, 5; shades, shadows, and perspective, 3; heat *or* experimental mechanics, 3; rhetoric 2; shop-practice, 3.

Second Term.—Metallurgy *or* electricity and magnetism, 3; mechanics, 5; machine construction, 4; rhetoric, 2; shop-practice, 3.

Third Term.—Machine construction *or* electricity and magnetism, 3; mechanics, 5; mill work, 4; drawing, 2; shop-practice, 3.

FOURTH YEAR.

First Term.—Mechanism, 5; machine drawing, and lectures, 4; mechanics, 5; shop-practice, 3.

Second Term.—Designing machinery, and lectures, 4; steam-engine, 5; physical laboratory practice, 4; shop-practice, 3.

Third Term.—Building materials and construction, 3; field practice and the use of instruments, 3; special study, and lectures, 4; working drawings, 4; shop-practice, 3.

For the requirements for admission to the Course in Mechanic Arts see page 31.

MILITARY SCIENCE.

Pursuant to the Act of Congress creating the land-grant on which the Cornell University is founded, and the Act of the Legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the First and Third Terms of the *First* and *Second Years* and the Second Term of the *Fourth Year.* Foreigners and laboring students and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, except such as may be excused on account of their inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the First and Third Terms of the first two years, and the Second Term of the *Fourth Year.* During the first two years there are three exercises a week, of an hour each; those of the *Fourth Year* consist of a regular course of lectures on the general operations and science of war, twice a week.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the *Third* or *Fourth Year* he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical Military Exercises include: (1) *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. (2) *Artillery Tactics.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. (3) *Special Exercises.*—To comprise recitations at such times as may be prescribed.

The advanced course of instruction in Military Science is optional, and is open to all undergraduates and to such special students as have sufficient scientific and practical preparation.

The course of instruction requires an attendance upon a class exercise or lecture of one hour on three days of the week during one year. The subjects are: (1) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field works; military mining; the attack and defense of works, and military roads and bridges. (2) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3) *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he must understand in order to enter upon the practice of the art. The lectures cover the whole ground, practical, scientific, historical, and æsthetic. The aim of the department is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Besides the White Architectural Library, means of illustration are provided for this department in valuable collections of photographs, drawings, models, casts, and samples of building materials.

The Course in Architecture.

Leading to the degree of Bachelor of Architecture.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French *or* German, 5; rhetoric, 2; free-hand drawing, 3; linear drawing, 1; six lectures on hygiene.

Second Term.—Algebra, 5; French *or* German, 5; rhetoric, 2; free-hand drawing, 3; projection and tinting, 1.

Third Term.—Trigonometry, 3; theory of equations, 2; descriptive geometry, 3, drawing, 1; French *or* German, 5; botany, 3.

SECOND YEAR.

First Term.—Analytical geometry, 5; descriptive geometry, 4, drawing, 2; French *or* German, 3; experimental mechanics *or* heat, 3; composition and elocution, 1.

Second Term.—Calculus, 5; French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; drawing, 3; composition and elocution, 1.

Third Term.—Building materials and construction, 3; French *or* German, 3; chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; drawing, 5; composition and elocution, 1.

THIRD YEAR.

First Term.—Shades, shadows and perspective, 3; mechanics (strength of materials), 3; heat *or* experimental mechanics, 3; lectures on Egyptian, Greek, and Roman architecture, 3; designing, and lectures, 4.

Second Term.—Lithology and determinative mineralogy, 2; lectures on Byzantine and Romanesque architecture, 5; mechanics (trusses), 3; designing, 3; acoustics and optics, *or* electricity and magnetism, 3.

THIRD TERM.--Mechanics (arches), 2; lectures on Gothic architecture, 5; free-hand drawing, 3; designing, 3; acoustics and optics *or* electricity and magnetism, 3.,

FOURTH YEAR.

FIRST TERM.—Lectures on Renaissance architecture, 3; geology, 3; designing, 6; stereotomy, 3.

SECOND TERM.—Stereotomy, applied to stone-cutting, 5; lectures on modern architecture, 3; economic geology, 3; designing, 4.

THIRD TERM.—Leotures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 3; designing, 9.

For the requirements for admission to the Course in Architecture see page 31.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory practice. Chemistry, Physics, Resistance of Materials, and Stone-cutting are taught practically. The field work embraces the usual operations and more recent methods of Land and Railroad Surveying, together with Hydrography and Geodetic practice. The latter embraces all the topographical, astronomical, and geodetic operations required in triangulating and making the chart projections of the coasts and interior of large territories.

Besides the application of mechanics and of the higher analysis to engineering investigations, the professional preparation of the students comprises the following subjects: The location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers, and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the construction of the various kinds of arch bridges and the design and construction of roofs, trusses, girders, and suspension bridges; the design, construction, and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection, and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The principal subdivisions of the work of this department are bridge architecture and construction, railroad engineering, hydraulic, topographical, sanitary, industrial, and mining engineering.

To meet the growing demand for special engineering studies, some option and diversity of study is allowed from the beginning of the third year of the courses to those students who evince special fitness for any particular branch of the subject. The Four Years course is mainly technical, and is designed for those who cannot afford the time to take the Five Years course. The latter contains the same technical studies as the former; but in addition students have in it one year of optional work alternating with prescribed studies, which they can devote to further scientific research, or to historical or literary subjects.

The Courses in Civil Engineering.

I. A FOUR YEARS COURSE.

Leading to the degree of Bachelor of Civil Engineering.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French *or* German, 5; rhetoric, 2; freehand drawing, 3; six lectures on hygiene.

Second Term.—Algebra, 5; French *or* German, 5; rhetoric, 2; right line drawing, 2; freehand drawing, 3.

Third Term.—Trigonometry, 3; theory of equations, 2; descriptive geometry, 3; drawing, 1; French *or* German, 5; botany, 3.

SECOND YEAR.

First Term.—Analytical geometry, 5; descriptive geometry, 4, drawing, 2; French *or* German, 3; experimental mechanics *or* heat, 3.

Second Term.—Calculus, 5; French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; pen topography, 2; tinting and shading, 2.

Third Term.—Calculus, 5; land surveying, 4; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; lettering, 2.

THIRD YEAR.

First Term.—Calculus and analytical geometry, 5; geology, 3; shades, shadows, and perspective, 3; heat *or* experimental mechanics, 3; topographical mapping and sketching, 2; essays, 1.

Second Term.—Economic geology, 3; analytical mechanics, 5; mineralogy *or* metallurgy, 2; acoustics and optics, *or* electricity and magnetism, 3; structural details and graining, 2.

Third Term.—Analytical mechanics, 5; railroad surveying, 5; acoustics and optics, *or* electricity and magnetism, 3; colored topography, 3.

FOURTH YEAR.

First Term.—Spherical and practical astronomy, 5, night observations, 2; analytical mechanics, 5; civil engineering, 2;

Egyptian, Greek, and Roman architecture, 3; stereotomy, 3; drafting of original problems, and technical essay.

SECOND TERM.—Analytical mechanics, 5; higher geodesy, 5; metallurgy *or* mineralogy, 2; stone-cutting, original problems, drawing and practice, 5.

THIRD TERM.—Civil engineering, 3; engineering economy, 2; bridge construction, 5; hydraulic motors, 2; hydrographic survey, chart making and geodetic practice, 3.

Students in these courses are required to write memoirs upon professional subjects of their own selection, before the close of the Third Term; and these memoirs are presented during the first week of the First Term. The memoirs of the last two years must contain original investigations.

II. A FIVE YEARS COURSE.

Leading to the degree of Civil Engineer.

With optional studies in history, literature, architecture, languages, and general or technical sciences. The first and second years of this course are the same as in the preceding course.

THIRD YEAR.

FIRST TERM.—Calculus and analytical geometry, 5; heat *or* experimental mechanics, 3; topographical mapping and sketching, 2; Roman history, 5, *or* physiology *or* zoology (vertebrates), 3, and modern languages, 2; essays, 1; English literature, 2.

SECOND TERM.—Analytical mechanics, 5; acoustics and optics, *or* electricity and magnetism, 3; structural details and graining, 2; philosophy of history, 3; history of the Roman empire, 5, *or* zoology (invertebrates), 3, and modern languages, 2, *or*, instead of languages, essays and orations, 1, and English literature, 2.

THIRD TERM.—Analytical mechanics, 5; railroad surveying, 5; acoustics and optics, *or* electricity and magnetism, 3; mediæval history, 5, *or* laboratory work, 3, and modern languages, 2, *or*, instead of languages, essays and orations, 1, and English literature, 2.

FOURTH YEAR.

FIRST TERM.—Geology, 3; analytical mechanics, 5; Egyptian, Greek, and Roman architecture, 3; shades, shadows, and perspective, 3; civil engineering, 2; American history, 2, *or* literature and oratory, 3.

SECOND TERM.—Economic geology, 3; analytical mechanics, 5; American history, 2, *or* Romanesque architecture, 3, *or* modern languages, 2; political economy, 2; literature and oratory, 3.

THIRD TERM.—Civil engineering, 3; engineering economy, 2; bridge construction, 5; colored topography, 3; two weeks of hydrographic field work, 3; logic, 3, *or* modern languages, 3, *or* extempore speaking, lectures on orators and oratory, 3, *or* Gothic architecture, 3.

FIFTH YEAR.

FIRST TERM.—Spherical and practical astronomy, 5, night observations, 2; stereotomy and drawing of original problems, 3; special work in projects, designs, and estimates, 3; Renaissance architecture, 3; modern history, 3, *or* riparian rights and law of contracts, 3.

SECOND TERM.—Higher geodesy, 5; stone-cutting, original problems, drawing, and practice, 5; metallurgy, 2; technical reading in foreign languages, 2; special work in astronomy and geodesy, 3.

THIRD TERM.—American law *or* quaternions and philosophy of mathematics, 5; hydraulic motors, 3; historical reading, 2; hydrographic survey, chart making, and geodetic practice, 3; the steam-engine, 2; original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

For the requirements for admission to the Courses in Civil Engineering see page 31.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this Department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the *First Year*, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of the analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is designed for those intending to teach Mathematics in academies and colleges, or to use it as an instrument of investigation.

According to the subject taught, there are five, three, two, or one exercise a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and, to an extent equivalent to at least five recitations a week for three terms, the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at the close. These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are often given without notice.

The Course in Mathematics.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

First Term.—Solid geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; hygiene, six lectures.

Second Term.—Algebra, 5; linear drawing, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

Third Term.—Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

First Term.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics, *or* heat, 3; physiology, 3; free-hand drawing, 3; composition and elocution, 1.

Second Term.—Calculus, 5; mathematical essays, 1; free-hand drawing, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1.

Third Term.—Calculus, 5; mathematical essays, 1; descriptive geometry, 3; drawing, 1; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1.

THIRD YEAR.

First Term.—Calculus and analytical geometry, 5; determinants, 2; descriptive geometry, 4, drawing, 2; heat *or* experimental mechanics, 3; essays, 1.

Second Term.—Differential equations, 5; harmonoid geometry, 3; descriptive astronomy, 3; mathematical essays, 1; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1.

Third Term.—Theory of functions, 5; physical astronomy, 3; mathematical essays, 1; acoustics and optics, *or* electricity and magnetism, 3; botany, 3; essays and orations, 1.

FOURTH YEAR.

First Term.—Quaternions, 5; mathematical essays, 1; shades, shadows, and perspective, 3; geology, 3; modern history, 3; English literature, 2.

Second Term.—Mécanique analytique, 5; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 5; mathematical essays, 1; philosophy of history, 3; English literature, 2.

Third Term.—Mécanique analytique, 5; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 3; mathematical essays, 1; logic, 3; English literature, 2; Constitution of the United States, twelve lectures.

For most of the studies which are not closely connected with Mathematics substitutes are allowed.

For the requirements for admission to the Course in Mathematics see page 31.

PHYSICS.

The instruction comprises a General Course of rather elementary character, and a Laboratory Course of advanced work for graduates and such undergraduates as are qualified to pursue it.

The exercises of the General Course consist of lectures illustrated by experiment, and recitations. It begins with the First Term of the Second Year, and continues two years. There are four subjects, distributed as follows: Experimental Mechanics one term; Electricity and Magnetism two terms; Heat one term; Acoustics and Optics two terms. The lectures on any one subject occur once in two years. A knowledge of Mathematics through Plane Trigonometry is required for registration in any one of these subjects, and for registration in Electricity and Magnetism a knowledge of Experimental Mechanics also. With the exception mentioned the several subjects are treated so far independently that they may be pursued in any order.

Each student must have the following text-books: Deschanel's *Natural Philosophy*, Cumming's *Electricity and Magnetism* (used in connection with the lectures on Mechanics), Fleming Jenkin's *Electricity and Magnetism*, Balfour Stewart's *Heat*, and the *Notes* on the Lectures. The *Notes* contain references by page and paragraph to works which may be consulted in the University Library.

The Laboratorv Course affords opportunity for making a more advanced study of the science than the General Course provides. Experiments are performed and the work is recorded and discussed. The experiments are chiefly of a quantitative nature, as better adapted to develop a thorough knowledge of the subject; but the special wants and aims of each student are consulted, and those who intend to teach the subject may spend a part of the time on experiments that are merely illustrative. For admission to the Laboratory some general knowledge of Physics is required; and some acquaintance also with Analytical Geometry and the Calculus will be found of great advantage.

CHEMISTRY AND MINERALOGY.

I. *DESCRIPTIVE AND THEORETICAL CHEMISTRY.*

The instruction begins with the lectures on Inorganic Chemistry in the First Term of the *Second Year.* During the whole of that year two lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the First Term of the *Third Year*, a course of lectures is given on the Chemistry of Organic Bodies. In addition to the final examination at the end of the term occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given, which is required of all students in the Course in Science in the Third Term of the *Sec-*

ond Year, and of students in the courses in Chemistry and Physics, and in Agriculture; it is required, further, of all students in other courses who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum amount of time (seven and a half hours a week) for two or three terms, and who for good and sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science; the details of the manipulation of each experiment are carefully described, but the results to be obtained are not given; for the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the Course in Chemistry and Physics, by recitations in Chemical Philosophy and lectures on organic chemistry.

Metallurgy and Mineralogy.—During the Second Term two lectures a week are devoted to each of these subjects in alternate years. The Course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction, the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in blowpipe analysis, with practice in the identification of crystalline forms, is required in connection with the lectures on Mineralogy.

II. *AGRICULTURAL AND ANALYTICAL CHEMISTRY.*

The general subject of Agricultural Chemistry is treated in a series of about one hundred lectures, for an account of which see page 38.

The Course in Analytical Chemistry, beginning in the *Second Year*, comprises Qualitative and Quantitative

Analysis in the wet way, and in the dry way (Blowpipe Analysis and Assaying), and is adapted in respect to length and completeness to the special course of study the student is pursuing.

In the Course in Chemistry and Physics, leading to the degree of B. S., the qualitative analysis in the wet way and the blowpipe· analysis are taken in the first two terms, beginning with the Second Term of the *Second Year*; this work may or may not, according to the proficiency attained in these two terms, extend into the following term. In connection with the quantitative work, which occupies at least a large part of the time devoted to chemical practice in the *Third* and *Fourth Years* of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic ultimate and proximate analysis, the analysis of gaseous mixtures, the chemical examination of waters and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

Lectures are given on methods and processes of analysis during the entire course, and examinations are required at the close of every term.

In the Course in Agriculture, the analytical practice of the agricultural chemistry begins in the First Term of the *Second Year*, and comprises analysis in the wet way only; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in the two terms of this year, so that all the time given to the subject in the *Third Year* may be devoted to quantitative analysis. This quantitative work begins, as in the Course in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods; the chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course. Lectures and examinations accompany the practice, as in the Course in Chemistry and Physics.

In the Course in Engineering a course of practice in Blowpipe Analysis is provided, which is intended to give to engineers such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this useful instrument in their field work, for the determination of the character of rocks and minerals.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The practice that is necessary for acquiring merely the rudiments of chemical analysis, renders it impracticable to accomplish more than this in the allotted time in this course. Students intending to study medicine who have more time for chemical practice, can take a longer and more thorough course which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances, and articles of food and drink, and to medical jurisprudence. A small number of lectures is given in connection with this practice, on the subject of medical analytical chemistry.

III. *INDUSTRIAL CHEMISTRY.*

A course of lectures is given in the Third Term of each year, and the subject is begun anew every second year.

The lectures relate to the applications of chemistry in the manufacturing industries and in daily life, and include among others the following subjects: acids and heavy chemicals, soaps, oils, coal gas, coal tar and its derivatives, glass, pottery, mortar and cement, leather, paper, paints, dyes and dying, alcoholic liquors, food, water, and air.

The treatment of these subjects embraces the consideration of the chemical nature of raw materials and the changes which they undergo in the course of manufacturing processes, the apparatus used and its resistance to chemical agents, the utilization or economical disposition of waste, and the perfection and purity of finished products. The subjects of food, water, and air are also considered from a chemical standpoint with reference to their sanitary and industrial relations.

In connection with these lectures a course of laboratory work is provided, which bears upon the industrial applications of chemistry, and special courses are laid out for students with reference to the needs of any branch of industry they may select. This work consists of analyses of raw materials and commercial products, determinations necessary to the chemical control of a technical process in its different stages, and, when the student is sufficiently prepared, of original investigation with a view to the improvement of some industrial method.

Practical illustration of the different subjects treated is furnished not only in the collections belonging to the department but also by means of excursions to mills and manufactories.

Besides the private chemical laboratories, for the professors and for special work, there are others with accommodations for two hundred students. They are provided with gas, water from the University mains, Bunsen filtration pumps, and a full supply of apparatus necessary for the prosecution of the study of chemistry in its various branches. The reading room of the laboratory contains the best works of reference in English, French, and German, and the current numbers of the more important chemical journals.

The Course in Chemistry and Physics.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

Third Term.—Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

First Term.—Analytical geometry, 5; French *or* German, 3; experimental mechanics *or* heat, 3; zoology, lectures and laboratory work, 3; composition and elocution, 1.

Second Term.—Chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; French *or* German, 3; zoology, lectures and laboratory work (invertebrates), 3; chemical practice, 5.

Third Term.—Chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; French *or* German, 3; botany, 3; chemical practice, 5.

THIRD YEAR.

First Term.—Chemical philosophy, 3; heat *or* experimental mechanics, 3; geology, 3; chemical practice, 7.

Second Term.—Chemical philosophy, 3; mineralogy *or* metallurgy, 2; organic chemistry, 1; acoustics and optics, *or* electricity and magnetism, 3; economic geology, 3; chemical practice, 5.

Third Term.—Chemical philosophy, 3; chemical technology, 2; acoustics and optics, *or* electricity and magnetism, 3; chemical practice, 7.

FOURTH YEAR.

First Term.—History of philosophy, 3; physical practice, 4; chemical practice, 10; organic chemistry, 1.

Second Term.—Metallurgy *or* mineralogy, 2; organic chemistry, 2; chemical practice, 8; physical practice, 4.

Third Term.—Chemical technology, 2; chemical processes, 2; chemical practice, 8; organic chemistry, 1.

For the requirements for admission to the Course in Chemistry and Physics see page 32.

NATURAL HISTORY.

I. *BOTANY.*

A course of lectures is given upon each of the following subjects: Physiological Botany, Gramineæ and Compositæ, Vegetable Physiology, Vegetable Histology, Systematic and Applied Botany, Plant Culture, Higher Cryptogamia, Fungi, and Algæ. Most of these courses of lectures are given in connection with laboratory work, which is further supplemented, whenever desirable, by field-work or class excursions.

The foregoing courses of instruction occupy five hours a week for six terms, or two years. Their arrangement as regards the collegiate terms and years is seen in the tabulated statement of the Course in Natural History.

The instruction in the various branches of Botany does not lose sight of the practical bearings of the science. Thus in Fungi a careful study is made of those forms which are destructive to cultivated plants; and in Systematic Botany, besides a study of the principles of classification and the special characteristics of the more prominent natural orders, notices are given of the history, uses, and importance of the chief economic species included in those orders.

The full Course in Botany as laid down is not intended to be absolutely rigid, but students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. Those who have completed a large share of the regular course are afforded opportunities for advanced work, consisting mainly of original investigations in some special branch of botanical science.

Besides the special facilities for instruction provided in the various collections, models, and apparatus belonging to the department, the local flora of more than a thousand species of phænogamia, and a proportionate number of cryptogamia, together with a considerable collection of exotic plants grown in the laboratories and in the borders and grounds, affords valuable means of illustration and material for work.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in General and Economic Geology and Lithology by means of lectures, laboratory practice, and excursions. The lectures consist of (1) a course in General Geology in the First Term, and (2) a course in Economic Geology in the Second Term.

Facilities for laboratory practice in Geology and Lithology are offered throughout the year, with excursions during the First and Third Terms.

Collections are provided in the Museum of Geology and Palæontology, and the Devonian rocks of Ithaca and neighborhood offer unlimited material for study and original research.

III. PALÆONTOLOGY.

Instruction is given each term in the laboratory, and during the First and Third Terms by excursions to the rich fossiliferous localities in and about Ithaca. Special lectures accompany the work of the First and Second Terms, and a regular course on Systematic Palæontology is given in the Third Term.

IV. ZOOLOGY.

The instruction comprises lectures, laboratory practice, and field work as follows :

A. Lectures.—*First Term.*—1. Hygiene, with especial reference to the needs of students, 6 lectures. 2. Human physiology, with painless experiments upon the frog and cat, 36 lectures. 3. Zoology of vertebrates, 36 lectures and practical exercises. 4. The anatomy and physiology of domesticated animals, 60 lectures. 5. Psychology and æsthetics, 24 lectures. 6. Anatomical technology, 12 lectures.

Second Term.—1. Zoology, 30 lectures. 2. Veterinary pathology, sanitary science, and parasites, 50 lectures. 3. Microscopical technology, 10 lectures, with practical demonstrations.

Third Term.—1. Comparative anatomy, either of the brain, or of some special group of vertebrates, 20 lectures. 2. Veterinary medicine and surgery, 50 lectures. 3. Economic entomology, 20 lectures. 4. Museum methods, and experimental technology, 10 lectures.

B. LABORATORY PRACTICE.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for any other work, the skeletons of man and the domestic cat are studied, and some of the bones described and drawn by the student. He then dissects some of the muscles, vessels, and nerves. In the Second Term, the methods of microscopic manipulation are learned, and the tissues of the cat, frog, and menobranchus are examined. In the Third Term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily this work can be commenced only at the beginning of the year.

After the First Year the student, according to his purposes, dissects other vertebrate animals or human subjects; or insects and other invertebrates. The advanced work in entomology may be either economic, or systematic, anatomical, histological, or embryological. There are special facilities for the study of the vertebrate brain.

C.—FIELD WORK.—During the Fall and Spring students are occasionally accompanied by their instructors to the field or lake in order to observe living animals and learn the methods of their capture. The outdoor study of insects injurious to vegetation is an important element of the instruction in economic entomology.

The Anatomical Laboratory has accommodations for the practical instruction of twenty special students, and is provided with microscopes, and other apparatus for anatomical and physiological work. In a large aquarium are living fishes and other fresh-water animals. Among these is the Menobranchus, which abounds in Cayuga Lake, and which supplies the best material for some experiments and histological demonstrations.

The Entomological Laboratory is provided with microscopes and other instruments and materials for research and instruction concerning insects, especially those which are injurious to vegetation.

There are extensive zoological, economic, and biological collections, with histological preparations, Auzoux models, diagrams, and other materials for instruction.

The Course in Natural History.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; free-hand drawing, 3; six lectures on hygiene.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemical lectures, 3; chemical laboratory work, 3.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemical lectures, 3; chemical laboratory work, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; human physiology, 3; zoology, lectures and laboratory work (vertebrates), 3; laboratory work in anatomy, 2; anatomical technology, 1; experimental mechanics *or* heat, 3; lectures on organic chemistry, 2.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; zoology, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1; blow-pipe determination of minerals, 3.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; botany, 3, field work in botany, 2; lectures on comparative anatomy of the brain, 2; laboratory work in comparative anatomy, 3; museum methods and experimental technology, 1.

THIRD YEAR.

First Term.—Lectures and laboratory work on higher cryptogamia, 3; compositæ and gramineæ, 2; geology, 3; psychology, 2; heat or experimental mechanics, 3; essays, 1; English literature, 2.

Second Term.—Vegetable physiology, 3; vegetable histology, 2; economic geology, 3; laboratory work in geognosy, 3; electricity and magnetism, *or* acoustics and optics, 3; essays and orations, 1; English literature, 2.

Third Term.—Lectures and laboratory work on algæ, 2; lectures on palæontology, 3; laboratory work in palæontology, 3; lectures on entomology, 2; laboratory and field work in entomology, 3; electricity and magnetism, *or* acoustics and optics, 3.

FOURTH YEAR.

First Term.—Fungi, 3; lectures on plant culture, 2; lectures on the anatomy, physiology, and hygiene of domestic animals, 5; laboratory and field work in palæontology or geology, 5; history of philosophy, 3.

Second Term.—Lectures on systematic and applied botany, 3; descriptive astronomy, 3; laboratory work in geology or palæontology, 3; advanced work in natural history, *or* veterinary science, 5; acoustics and optics, *or* electricity and magnetism, 3.

Third Term.—Advanced work in natural history, *or* veterinary science, 8; physical astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3.

V. *PRELIMINARY MEDICAL EDUCATION.*

Not leading to a degree.

There is no Medical Department of the University, but special facilities are provided for those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curriculum of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. Hence, they strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become Resident Graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the fourth year.

In case the student can remain but two years, he is advised to take the Two Years Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical course.

Finally, special students are received for a shorter period than two years, provided they are fitted to undertake the lectures and laboratory work.

A Two Years Course Preparatory to the Study of Medicine.

Not leading to a degree.

FIRST YEAR.

FIRST TERM.—Chemical laboratory practice, 3; zoology, lectures and laboratory work (vertebrates), 3; human physiology, 3; freehand drawing, 3; rhetoric, 2; French *or* German, 3; six lectures on hygiene.

SECOND TERM.—Chemical lectures, 3; chemical laboratory practice, 3; zoology, lectures and laboratory work (invertebrates), 3; freehand drawing, 3; rhetoric, 2; French *or* German, 3.

THIRD TERM.—Chemical lectures, 3; medical chemistry, laboratory practice, 4; botany, 3; botanical laboratory practice, 2; rhetoric, 2; French *or* German, 3.

SECOND YEAR.

FIRST TERM.—Organic chemistry, 2; anatomy, physiology, and hygiene of domesticated animals, 5; psychology, 2; anatomical technology, 1; anatomical laboratory practice, 2; German *or* French, 5.

SECOND TERM.—Vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histological laboratory practice, 2; laboratory practice in vegetable physiology, 2; German *or* French, 5.

THIRD TERM.—Comparative anatomy of the brain, 2; laboratory practice in anatomy, 5; veterinary medicine and surgery, 5; museum methods and exoerimental technology, 1; German *or* French, 5.

Upon the completion of this course the student is entitled to a certificate countersigned by the professor in physiology. This certificate, or one covering an equivalent amount of similar work performed in either of the full four years courses or in post-graduate courses, usually exempts the holder from one of the three years of study under the direction of a physician commonly required for graduation in medicine.

For the requirements for admission to the above courses see page 33.

LANGUAGES.

I. *THE ANCIENT CLASSICAL LANGUAGES.*

An outline of the course of reading in the Classics is given below. Greek belongs to the Course in Arts, Latin to the courses in Arts, Literature, and Philosophy, and the distribution as to required and elective study may be seen by consulting the tabulated statements of those courses. Exercises in Greek and Latin composition accompany the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

Greek.

FIRST YEAR.

FIRST TERM.—Plato's Apology of Socrates.
SECOND and THIRD TERMS.—Homer and Herodotus.

SECOND YEAR.

FIRST TERM.—Thucydides.
SECOND and THIRD TERMS.—Euripides, Æschylus, Aristophanes (one play of each).

THIRD YEAR.

FIRST TERM.—Plato, continued.
SECOND and THIRD TERMS.—Sophocles.

FOURTH YEAR.

FIRST TERM.—Selections from the Attic Orators.
SECOND and THIRD TERMS.—Dramatic Poets, continued; selections from the Lyric and Bucolic Poets.

Latin.

FIRST YEAR.

FIRST TERM.—Livy.
SECOND TERM.—Cicero (Essays and Letters).
THIRD TERM.—Horace (Odes and Epodes).

SECOND YEAR.

FIRST TERM.—Tacitus (Agricola and Germania).
SECOND TERM.—Quintilian (Book X); selections from Roman lyric, elegiac, and epigrammatic poetry.
THIRD TERM.—Horace (Satires and Epistles).

THIRD YEAR.

FIRST TERM.—Plautus and Terence.
SECOND TERM.—Pliny the Younger.
THIRD TERM.—Lucretius and Virgil.

FOURTH YEAR.

FIRST TERM.—Tacitus (Annals).
SECOND TERM.—Catullus, Cicero (Orations and Dialogues).
THIRD TERM.—Juvenal and Persius.

II. *ORIENTAL LANGUAGES.*

None of the languages here included are required for any Baccalaureate degree conferred by the University. The Professor of Sanscrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

Hebrew, Chaldee, and Ancient Syriac are taught by Professor Wilson.

III. *GERMANIC LANGUAGES.*

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training, some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

German.

During the whole of the *First Year* Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the First Term a knowledge of the inflections is gained, and the strong verbs are begun, stories and ballads are translated, with daily exercises in writing. In the Second Term the strong verbs are completed, the syntax of nouns, uses of the moods, and the arrangement of sentences are studied, with advanced translation and writing German. In the Third Term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's Law, in connection with the special study of etymology.

In the First Term of the *Second Year* one of Schiller's or Goethe's dramas is studied, followed in the Second Term by extracts from Goethe's or Schiller's prose. In the Third Term Goethe's *Hermann und Dorothea*, Lessing's *Minna von Barnhelm*, or some similar work, is read.

During the *Third* and *Fourth Years* occur optional lectures and recitations on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, recent dramatic literature.and the works of living novelists are read.

Other Germanic Languages.

Special instruction is given in Gothic, Old and Middle High German, and in the Scandinavian and Netherland languages.

In Gothic, Heyne's and Bernhardt's editions of *Ulfilas* are used. In Old German, Braune's *Althochdeutsches Lesebuch* is used, and lectures are given on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books; Swedish, Danish, and Icelandic are studied, and lectures are given on Scandinavian history and literature.

IV. *ROMANCE LANGUAGES.*

French.

French Grammar is studied during the First and Second Terms, and translation is begun in the Third. In the *Second Year* classical French plays are read. After two years, French is optional, and those who elect it read the history of French literature.

Italian.

FIRST YEAR.

FIRST TERM.—Sauer's Conversation Grammar (4th edition).
SECOND TERM.—Goldoni's Il Vero Amico.
THIRD TERM.—Manzoni's I Promessi Sposi.

SECOND YEAR.

FIRST TERM.—Dante's Inferno (Clarendon Press Series).
SECOND and THIRD TERMS.—Ebert's Handbuch der Italienischen National-Literatur; 1st Book, Italian Literature from its origin to the time of Lorenzo de' Medici.

Spanish.

FIRST YEAR.

FIRST TERM.—Montague's Manual Grammar in connection with exercises in writing.
SECOND and THIRD TERMS.—Padre Isla's translation of Le Sage's Gil Blas and Moratin's El Si de las Niñas.

SECOND YEAR.

First Term.—Don Quijote.
Second Term.—Calderon's El Principe Constante.
Third Term.—Poema del Cid (Vollmöller's edition).

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the General Courses of Study, either as required or elective work, the matter being distributed as shown in the tabulated statements of those courses.

I. *ANGLO-SAXON AND ENGLISH LITERATURE.*

A. Special Course.

FIRST YEAR.

Second Term.—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

Third Term.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.

First Term.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

Second Term.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.

First Term.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer.

Second and Third Terms.—The critical textual study of a play of Shakespeare, and Hale's Longer English Poems.

B. A General Course in English Literature.

First Term.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

Second Term.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

Third Term.—Lectures on English and American literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Two lectures a week are given through one year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the Second Term, as given above, or, sometimes of the Third.

II. *RHETORIC AND GENERAL LITERATURE.*

The *First Year* embraces the principles of elementary rhetoric, with practical exercises by the student, and recitations and reports of the lectures.

During the *Second Year*, the written exercises consist of themes, beginning with narration, and gradually advancing to description and exposition, these compositions being read in the class and corrected by the teacher. Elocution is also a required study during this year.

More advanced themes are assigned during the *Third Year*, and orations are also written and delivered before the class.

During the *Fourth Year*, the writing of essays and orations is continued, the themes embracing the topics of literary criticism and advanced rhetoric. Lectures are also given during the three terms on Literature, Literary Criticism, and Oratory. The exercises are on topics connected with the theory and application of rhetorical principles, the different periods of literature, and the leading representative essayists and orators.

In the *Third Year* advanced classes are formed in elocution and in the *Fourth Year* in rhetorical exercises from Shakespeare, Burke, Webster, and Demosthenes. During the last two years, opportunity is also given for oral discussion and extemporaneous speaking. No text-books are used, but collateral references are given and the lectures supplemented by courses of reading.

PHILOSOPHY.

Instruction in Philosophy begins the First Term of the *Third Year*. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge. It is resumed the Third Term, the subject being logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the First Term of the *Fourth Year* is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic; during the Second Term, moral philosophy, theories of morals, and the development of moral sentiments

HISTORY AND POLITICAL SCIENCE.

The Historical and Political Sciences are taught chiefly by lectures arranged in chronological sequence —Roman history being followed by the mediæval and modern history, the history of England, and the constitutional history of the United States.

The department of Political Science is intended to embrace all the important topics connected with political and social science. At present courses of lectures are delivered on Political Economy, and Constitutional and Municipal Law.

A Two Years Course in History and Political Science.

Not leading to a degree.

The requirements for admission are the same as for admission to the University, with the addition of Latin Grammar, and four books of Cæsar.

FIRST YEAR.

FIRST TERM.—Roman history, 5; psychology, 2; rhetoric 2, composition and elocution, 1; *elective*, 5; six lectures on hygiene.

SECOND TERM.—History of the Roman Empire, 5; moral philosophy, 2; rhetoric, 2, composition and elocution, 1; *elective*, 5.

THIRD TERM.—Mediæval history, 5; logic, 3; rhetoric, 2, composition and elocution, 1; *elective*, 5.

SECOND YEAR.

FIRST TERM.—Modern history, 3; American history, 2; English literature, 2; essays, 1; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; political economy, 2; English literature, 2; essays and orations, 1; literature and oratory, 3; *elective*, 5.

Third Term.—American law, 5; English literature, 2; essays and orations, 1; extempore speaking and lectures on orators and oratory, 3; *elective*, 5.

On the completion of the course the student receives a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

GENERAL COURSES OF STUDY.

The Course in Arts.

The Course in Arts, or Full Classical Course, leading to the degree of Bachelor of Arts, answers to the usual academic course of American colleges. The hours designated as *elective* may be devoted by the student to any subject he is qualified to pursue.

FIRST YEAR.

FIRST TERM.—Greek, 4; Latin, 4; geometry and conic sections, 5; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Greek, 4; Latin, 4; algebra, 5; rhetoric, 2.

THIRD TERM.—Greek, 4; Latin, 4; trigonometry 3; theory of equations, 2; rhetoric 2.

SECOND YEAR.

FIRST TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective*, 6.

SECOND TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective*, 6.

THIRD TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective* 6.

THIRD YEAR.

FIRST TERM.—Psychology, 2; essays, 1; *elective*, 12.

SECOND TERM.—Political economy, 2; essays and orations, 1; *elective*, 12.

THIRD TERM.—Logic, 3; essays and orations, 1; *elective*, 12.

FOURTH YEAR.

FIRST TERM.—History of philosophy, 3; literature and oratory, 3; *elective*, 10.

SECOND TERM.—Moral philosophy, 2; literature and oratory, 3; *elective*, 10.

THIRD TERM.—Extempore speaking, and lectures on orators and oratory, 3; lectures of non-resident professors; *elective*, 10.

Students electing *Physics* are required to continue the study through one complete part of the subject, and those electing *Chemistry* are required to continue it through the two terms.

For the requirements for admission to the Course in Arts see page 33.

The Course in Literature.

The Course in Literature, leading to the degree of Bachelor of Literature, is based on Latin, without Greek, and designed for those who prefer studies of a specially literary nature.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; Latin, 4; physiology, 3; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; Latin, 4; Anglo-Saxon, 4; rhetoric, 2.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; Latin, 4; botany, 3; Anglo-Saxon, 3.

SECOND YEAR.

FIRST TERM.—German, 5, and French, 3, *or* French, 5, and German, 3; Anglo-Saxon, 3; Latin, 4; composition and elocution, 1.

SECOND TERM.—German, 5, and French, 3, *or* French, 5, and German, 3; early English, 3; Latin, 4; composition and elocution, 1.

THIRD TERM.—German, 5, and French, 3, *or* French, 5, and German, 3: Latin, 4; early English, 2; composition and elocution, 1.

THIRD YEAR.

FIRST TERM.—Psychology, 2; Roman history, 5; Latin, modern languages, *or* science, 6; essays, 1; English literature, 2.

SECOND TERM.—Political economy, 2; history of the Roman empire, 5; Latin, modern languages, *or* science, 6; essays and orations, 1; English literature, 2.

THIRD TERM,—Logic, 3; mediæval history, 5; Latin, modern languages, *or* science, 6; essays and orations, 1; English literature, 2.

FOURTH YEAR.

FIRST TERM.—Modern history, 3; American history, 2; history of philosophy, 3; special literature, 2; literature and oratory, 3; Latin, modern languages, *or* science, 4.

SECOND TERM.—American history, 2; philosophy of history, 3; moral philosophy, 2; special literature, 2; literature and oratory, 3; Latin, modern languages, *or* science, 4.

THIRD TERM.—American law, 5; special literature, 2; extempore speaking, and lectures on orators and oratory, 3; Latin, modern languages, *or* science, 4; lectures of non-resident professors.

For the requirements for admission to the Course in Literature see page 33.

The Course in Philosophy.

The Course in Philosophy, leading to the degree of Bachelor of Philosophy, is based on Latin, without Greek, and designed for those who prefer studies of a philosophical nature.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; Latin, 4; French *or* German, 5; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; Latin, 4; French *or* German, 5; rhetoric 2.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; Latin, 4; French *or* German, 5; botany, 3.

SECOND YEAR.

FIRST TERM.—German *or* French, 3; zoology, lectures and laboratory work (vertebrates), 3; analytical geometry, 5; experimental mechanics, *or* heat, 3; composition and elocution, 1.

SECOND TERM.—German *or* French, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; zoology, lectures and laboratory work (invertebrates), 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD TERM.—German *or* French, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD YEAR.

FIRST TERM.—Psychology, 2; Roman history, science, mathematics, *or* languages, 5; geology, 3; heat, *or* experimental mechanics, 3; essays, 1; English literature, 2.

SECOND TERM.—Political economy, 2; history of the Roman empire, science, *or* languages, 5; descriptive astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1; English literature, 2.

THIRD TERM.—Logic, 3; mediæval history, science, *or* languages, 5; physical astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1; English literature, 2.

FOURTH YEAR.

FIRST TERM.—Modern history, 3; American history, 2; history of philosophy, 3; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; moral philosophy, 2; literature and oratory, 3; *elective*, 5.

THIRD TERM.—American law, 5; extempore speaking, and lectures on orators and oratory, 3; *elective*, 5; lectures of non-resident professors.

For the requirements for admission to the Course in Philosophy see page 33.

The Course in Science.

The Course in Science, leading to the degree of Bachelor of Science, is designed for those who wish to pursue studies relating chiefly to natural science, without Latin or Greek.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

THIRD TERM. — Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; botany, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; zoology, lectures and laboratory work (vertebrates), 3; analytical geometry, 5; experimental mechanics, *or* heat, 3; composition and elocution, 1.

SECOND TERM.—French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; zoology, lectures and laboratory work (invertebrates), 3; composition and elocution, 1; calculus, *or* science, 5.

THIRD TERM.—French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; calculus *or* science, 5.

THIRD YEAR.

FIRST TERM.—Heat, *or* experimental mechanics, 3; organic chemistry, 2; geology, 3; English literature, 2; essays, 1; *elective*, six hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* or *zoology*.

SECOND TERM.—Acoustics and optics, *or* electricity and magnetism, 3; economic geology, 3; English literature, 2; essays and orations, 1; descriptive astronomy, 3; *elective*, four hours, which must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), or *zoology*.

THIRD TERM.—Acoustics and optics, *or* electricity and magnetism, 3; descriptive geometry, 3, drawing, 1; English literature, 2; essays and orations, 1; physical astronomy, 3; *elective*, four hours, which must be given to one of the following sciences: *botany*, *chemistry*, *geology*, or *zoology*.

FOURTH YEAR.

FIRST TERM.—Modern history, 3; American history, 2; *elective*, eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany*, *chemistry*, *geology*, *mathematics*, *physics*, or *zoology*.

SECOND TERM.—American history, 2; political economy, 2; *elective*, eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

THIRD TERM.—Constitution of the United States, twelve lectures; *elective*, eleven hours, subject to the same conditions as in the first term of this year.

The elective hours not required for science in the *Third* and *Fourth Years*, may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the *Third* and *Fourth Years* students are required to take at least the minimum amount, given throughout the year, of each science elected.

Students intending to take the physics of the *Fourth Year* must take the calculus of the *Second Year*; those intending to take geology of the *Fourth Year* must take blow-pipe determination of minerals previous to that year.

For the requirements for admission to the Course in Science see page 32.

The Course in Science and Letters.

The Course in Science and Letters, leading to the degree of Bachelor of Science, is designed for those who wish to pursue both scientific and literary studies, without Latin or Greek.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

Third Term. — Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

First Term.—French *or* German, 3; physiology, 3; zoology, lectures and laboratory work (vertebrates), 3; composition and elocution, 1; analytical geometry, *or* science and modern languages, 5.

Second Term.—French *or* German, 3; zoology, lectures and laboratory work (invertebrates), 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

Third Term.—French *or* German, 3; botany, 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD YEAR.

First Term.—Psychology, 2; Roman history, 5; geology, 3; heat *or* experimental mechanics, 3; English literature, 2; essays, 1.

Second Term.—Political economy, 2; history of the Roman empire, 5; acoustics and optics, *or* electricity and magnetism, 3; descriptive astronomy, 3; English literature, 2; essays and orations, 1.

Third Term.—Logic, 3; mediæval history, 5; acoustics and optics, *or* electricity and magnetism, 3; physical astronomy, 3; English literature, 2; essays and orations, 1.

FOURTH YEAR.

First Term.—Modern history, 3; American history, 2; history of philosophy, 3; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; moral philosophy, 2; literature and oratory, 3; *elective*, 5.

THIRD TERM.—American law, 5; extempore speaking, and lectures on orators and oratory, 3; *elective*, 5.

For the requirements for admission to the Course in Science and Letters see page 32.

THE UNIVERSITY LIBRARY.

The Library contains about forty thousand volumes besides fifteen thousand pamphlets. It is made up chiefly of the following collections: A selection of about five thousand volumes purchased in Europe, in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literature, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to Oriental languages, Oriental literature, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student of technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Honorable William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of the late Jared Sparks, President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarians for other works desired. Graduate students are admitted to the alcoves.

GRADUATION.

Time Required for Graduation.

No person may receive a baccalaureate degree who has not spent four entire years in this University, except in case of one who has pursued elsewhere part of the studies of his course. Students admitted to advanced studies must, before the close of their first year, pass examinations on the previous work of the classes they enter.

Graduation Theses.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory oration, poem, or essay on some subject in Science or Literature, and to deposit a copy in the University Library.

The Degree of Bachelor.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Mathematics, and Natural History. The particular course is specified in the diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person is allowed to receive more than one degree at the same Commencement.

Advanced Degrees.

Graduate courses of study leading to advanced degrees are provided for in the following general departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any graduate intending to take an advanced degree must apply to the Faculty to be admitted as a candidate for that degree and signify the departments in which he wishes to prepare himself.

The MASTER'S Degree in Arts or Science, is conferred on those who have taken the corresponding Bachelor's degree here, or elsewhere where the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year in this University in a course of graduate study marked out for him by the Faculty, and must present a satisfactory thesis, and pass a satisfactory examination at the University on the course pursued.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same in all re-

spects as above, except that the degree is not given until three years after the Baccalaureate degree has been conferred.

3. Any person who has taken a Baccalaureate degree in this University may become a candidate for either of the above second degrees by passing satisfactorily such additional examinations as may be required for the corresponding first degree.

The degree of MASTER OF SCIENCE is conferred on graduates in the Course in Philosophy on the same conditions as if they had been graduated in the Course in Science.

The degree of CIVIL ENGINEER is conferred (1) on Bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presenting a satisfactory thesis; (2) on those who have completed the five years course, at their graduation.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those graduates who, after receiving the degree of Bachelor of Veterinary Science, have spent two years in additional study, and passed satisfactory examinations thereupon.

The degree of DOCTOR OF PHILOSOPHY is conferred on graduates of the University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the Course in Philosophy, a knowledge of Greek equal to that required for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must, at least six weeks before Commencement, present a meritorious thesis upon some subject included in the course, and he must pass an examination on the course.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have:

(*a*) A knowledge of Latin and Greek at least equal to that required for admission to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required for graduation in the Course in Science.

(*c*) A knowledge of science, of literature, and of philosophy equal to that required for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Candidates for the Doctor's degree are required to print their theses and deposit ten copies in the Library. Other candidates for advanced degrees are required to deposit one copy.

No student in any graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held during the second week before Commencement.

MISCELLANEOUS INFORMATION.

Terms and Vacations.

The academic year is divided into three terms, and there are three vacations.

Commencement Day is the third Thursday in June.

The First Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December.

The Second Term begins on the Tuesday after the second day of January; except when, in leap-year, that Tuesday is the third day of January, in which case it begins on the Tuesday after the third. It ends the Friday after the twenty-third of March.

The Third Term begins on the second Saturday after the end of the Second Term; the instruction begins on the Monday following, and continues until Commencement.

For the terms and vacations of the present academic year, see the Calendar.

Inquiries Regarding Departments, Etc.

Persons wishing more detailed information than is given in the *Register* as to courses of study, methods of instruction, and the like, may address the professor in charge of the department concerned.

Directions to Candidates for Admission.

Candidates for admission will obtain permits for examination at the Registrar's office (in the south University building), and the results of examinations may be ascertained from the Registrar. Each person, upon admission, receives a copy of the "Rules for the Guidance of Students," and is thereafter supposed to be acquainted with its contents.

Registration.

The Registration Day for each term is indicated in the Calendar. On that day each student qualified for admission, whether previously a member of the University or not, is required to give notice of his studies for the term to the Registrar in person and receive a ticket of registration. No person is allowed to register at any other time, except by permission of the Faculty In order to join any class, the student must show his registration ticket to the instructor in charge.

Payments to the University.

The fee for tuition is twenty-five dollars a term, payable at the beginning of the term.

Tuition is free (1) to *State Students;* (2) to *Resident Graduates;* and (3) to students pursuing either of the prescribed courses in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory practice in Chemistry, Physics, Zoology, or Entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings are required to pay their room-bills one month in advance. All members of the University are held responsible for any injury done by them to its property.

The fee for the Baccalaureate degree is *five* dollars; for any advanced degree, *ten* dollars.

Exercises of the Term.

A printed schedule of University exercises is issued at the beginning of each term. Most of the lectures and recitations occur between the hours of 8 a. m. and 1 p. m., from Monday to Friday inclusive. Every student is required to take the equivalent of fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory practice, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

Examinations.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The

Course-book affords the student an opportunity of preserving a record of his examinations; it is procurable at the bookstores, and the entries in it are made by the Registrar, or by the heads of the departments.

Expenses of Residence.

The following is an approximate estimate of the yearly expenses:

Tuition, $25 a term, - - - - - - -	$ 75.00
Room, board, lights, and fuel, about - - -	240.00
Text-books, etc., - - - - - - - -	25.00
Total, - - - - - -	$340.00

Cascadilla Place is owned by the University, and is rented to professors and students.

The cost for board, rent of furnished room, fuel and lights at the Sage College, varies from $5.50 to $7.50 a week. Students occupying one of the most desirable rooms alone, pay $7.50 a week. If two occupy such a room together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study-room.

The expense of living in Ithaca varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board.

APPENDIX.

ENTRANCE EXAMINATION PAPERS.

English Grammar.

1. Write a short account of yourself containing information in regard to the following particulars: (*a*) name; (*b*) birth-place; (*c*) age; (*d*) school; (*e*) intended course of study in the University; (*f*) purpose in entering.

2. What is the name given to classes of words divided according to their office or use in the sentence?

3. Write an interrogative sentence and parse it.

4. What is meant by conjugating a verb?

5. Define *abstract*, *gender*, *declension*, *analysis*, and *comparison*, as used in grammar.

6. Why are certain pronouns called *personal?*

7. Mention the demonstrative pronouns with their plurals.

8. Name four ordinal adjectives.

9. State the difference between co-ordinating and subordinating conjunctions.

10. Write a sentence containing an adjective clause, drawing a line under the clause.

11. Write the meaning of the following verses in the simplest prose construction:

> " Will fortune never come with both hands full,
> But write her fair words still in foulest letters?
> She either gives a stomach and no food,—
> Such are the poor, in health ; or else a feast,

And takes away the stomach,—such are the rich,
That have abundance and enjoy it not."

12. Illustrate by examples from the foregoing passage the meaning of the following terms: antecedent, case, conjunction, mood, preposition, subject, predicate, adverb.

13. Write a sentence in which the verb has a direct and an indirect object.

14. State the grammatical relation of each word in the following:

"Let me but bear your love, I'll bear your cares."

Geography.

1. Over what waters would you sail in going from Bombay to Lyons?
2. Over what waters would you sail from Yokohama to Paris?
3. What countries would one pass on the right in coasting from Honduras to Alaska?
4. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
5. Name the countries of Africa.
6. Bound Holland, Switzerland, France.
7. Bound Beloochistan, China Proper, Arabia.
8. What rivers flow into the Black Sea?
9. What rivers flow into the Mediterranean and its gulfs?
10. Describe the Nile, its origin, its course, and its outlet.
11. What rivers flow into the Baltic?
12. Name the inland seas and lakes of Asia.
13. Over what countries would a straight line from Brussels to Constantinople pass?
14. Over what countries would a straight line from Caracas to Montevideo pass?
15. Bound Ecuador, Bolivia, Uraguay.
16. Bound Utah, Kansas, Minnesota.
17. Over what States would a straight line from Tallahassee to St. Paul pass?
18. Describe the Gulf Stream and its course.

19. Describe the Arctic Current.
20. What is the average depth of oceans?
21. Explain the Trade winds and Monsoons.
22. State the various uses of mountains.
23. Describe the systems of mountain chains by which the surface of the earth is traversed.
24. Describe the table-lands of Asia.
25. Describe the Great Northern Plain of Europe.

Elementary Physiology.

EXCLUSIVE OF THE NERVOUS SYSTEM.

1. (*a*) Enumerate the digestive fluids, stating which is acid. (*b*) What is the general object of digestion? (*c*) What happens to milk in the stomach?

2. (*a*) Of what is the heart chiefly composed? (*b*) Give a diagram of the right side of the heart, showing the relative thickness of the walls, the position of the vessels, and valves, and naming all the parts.

3. (*a*) Which way does blood flow in the arteries of the arm? (*b*) In the veins of the arm? (*c*) Explain the pulse.

4. (*a*) Name the uses of the tongue. (*b*) Of the lips and cheeks. (*c*) What happens to the larynx when you swallow?

5. (*a*) State the normal composition of the air. (*b*) State the physical and chemical differences between the air inspired and the breath expired.

Arithmetic.

1. Define: a composite number, a factor, an abstract number, the cube root of a number, equation of payments.

2. What is the value of 50 lb. 8 oz. of gold at \$20.59$\frac{1}{4}$ per ounce?

3. Given the metre equal to 30.37 inches, reduce one mile to kilometres. Give the metric table of weights.

5. Divide $\frac{2}{3}$ of $7\frac{3}{4}$ by $\frac{4}{5}$ of $12\frac{11}{12}$. Prove the result by reducing the fractions to decimals and working the example anew.

5. A man said, "I will spend half my income, save a third of

it, and devote a fourth to business." His income was \$780 a year. Point out his blunder, and divide his income rightly in the proportion intended by him.

6. How long must \$125 be on interest at $7\frac{1}{2}$ per cent to gain \$15?

7. Received 6 per cent. dividend on stock bought at 25 per cent. below par; what rate of interest did the investment pay?

8. Find the cube root of .726572699.

Elementary Algebra.

I. Define: The degree of a term, an algebraic fraction, the least common multiple of two polynomials, a rational quantity, a surd.

2. Divide $3x^2+6x+4x^4+1$ by $3-2x+2x^2$. Find the quotient to four terms, the remainder and the complete quotient.

3. Factor completely the expressions: x^6-16x^3+64, and $ax+2bx-3ay-6by$.

4. From the equations: $ax+by=c$ and $dx+ey=f$, eliminate y and find x:

a. By "addition or subtraction";

b By "substitution";

c. By "comparison."

5. Reduce to its simplest form:

$$\frac{x-y}{\frac{1}{x}-\frac{1}{y}} \div 4(\tfrac{1}{2}xy)^2.$$

6. Reduce to their simplest forms:

$$\left(\frac{x^{-1}\,y}{x^{\frac{1}{2}}\,y^{-\frac{1}{2}}}\right)^{-\frac{1}{2}} \times (xy)^\circ, \text{ and } \frac{1}{2}\sqrt{6} : \sqrt{10 \div 2^3\sqrt{15}}.$$

7. Find the cube root of

$777x^4y^2-531x^3y^3\div444x^2y^4-144xy^5+64y^6+343x^6-441x^5y.$

8. Clear of radicals the equation

$$x^2-\sqrt{12-2x^2=2}.$$

solve it, and find the sum and the product of all the roots.

9. A boat's crew rows $3\frac{1}{2}$ miles down a river and back again in one hour and forty minutes. The river has a current of two miles an hour. Find the rate at which the crew would row in still water.

Higher Algebra.

1. In an Arithmetical Progression, given the fundamental formulæ $l=a+(n-1)d$ and $s=\frac{1}{2}(a+l)n$; thence find the value of n in terms of s, l, and d.

2. Find a formula, and thence write a rule, for getting amount at compound interest when principal, rate, and time are given.

3. By the method of "Differences," find the 25th term, and the sum of 25 terms, of the series 1, 8, 27, 64, 125. . . .

4. By the "Binomial Theorem," develop $(a-2x)^{\frac{3}{4}}$ to 5 terms; and write the general term.

5. By the method of "Undetermined Co-efficients," develop $\frac{a+x}{(a-2x)^2}$ to 5 terms, and give the "scale" by which other terms are found.

6. Reduce 3.1416 to a continued fraction, and thence derive its successive approximate values.

7. Prove that $\log_a b \times \log_b a=1$.

If $\log 2=0.30103$, and $\log 3=0.47712$, find $\log 6$, $\log \frac{1}{60}$, $\log 216$, $\log \sqrt[3]{.6}$, $\log .25$.

8. If a be a root of the equation $x^n+Ax^{n-1}+ \ldots +L=0$, show that $x-a$ is a factor of $x^n-Ax^{n-1}+ \ldots +L$; and conversely.

9. State Horner's method of approximating to the incommensurable roots of an equation.

10. Given the equation $x^4-8x^3+24x^2-32x-84=0$, find the Sturm functions, and thence show how many real roots there are, and how many imaginary roots if any.

Plane Geometry.

1. Define: A surface, a plane angle, a perpendicular, the projection of a point upon a line, an isosceles triangle, a regular polygon, a square, a segment of a circle, a proportion, a demonstration.

2. If a perpendicular be erected at the middle of a straight line, then:

(1) Every point in the perpendicular is equally distant from the extremeties of the line.

(2) Every point without the perpendicular is unequally distant from the extremeties of the line.

3. In the same circle, or in equal circles, two angles at the centre are in the same ratio as their intercepted arcs. Prove for both commensurable and incommensurable arcs.

4. Two triangles are similar, when an angle of the one is equal to an angle of the other and the sides including these angles are proportional.

5. To construct a triangle equivalent to a given polygon.

6. The circumferances of two circles are to each other as their radii, and their areas are to each other as the squares of their radii.

If the areas of two circles be as 16 to 25, and the diameter of the first circle be twenty inches, what is the diameter of the other?

Solid Geometry and Conic Sections.

1. Define: The angle made by two lines not in the same plane, similar polyedrons, a spherical triangle, the ordinate of a point on a curve, the subtangent of a parabola.

2. If two angles not in the same plane have their sides respectively parallel and lying in the same direction, they are equal, and their planes are parallel.

3. Two triangular pyramids, having equvialent bases and equal altitudes, are equivalent.

4. The area of a spherical triangle is equal to the excess of the sum of its three angles over two right angles—the unit of angle being the right angle, and of area, the tri-rectangular triangle.

5. The volume of a sphere is equal to the area of its surface multiplied by one-third of its radius.

6. The lateral surface of a pyramid is greater than the base.

7. The tangent to a hyperbola bisects the angle between the lines drawn from the line of contact to the foci.

Trigonometry.

1. Define the secant and the cosecant of an angle. Find the value of the tangent of an angle in terms of each of the other functions.

2. Find the values of the functions of $(270^\circ \pm \theta)$ in terms of the functions of θ.

3. Give the values of sin 2θ and cos 2θ, and thence find the value of sin 3θ in terms of sin θ.

4. Show that in any plane triangle $\cos A = \frac{b^2+c^2-a^2}{2bc}$.

5. Show that in any spherical triangle.

$$\cos \tfrac{1}{2}A = \sqrt{\left(\frac{\sin s \sin (s-a)}{\sin b \sin c}\right)}, \text{ wherein } 2s = a+b+c.$$

6. Show how to solve a spherical right triangle, given one angle and the opposite side.

7. Solve the plane right triangle, given an angle, 64° 12′ 37″, and the opposite side, 741.53.

8. Solve the spherical oblique triangle, given two sides, 70° 13′ and 139° 12″, and the included angle, 60°.

French.

Translate the following sentences in their order into French, writing very plainly on only one side of the paper, and place your name on every half sheet.

1. My brother and sister are very good. Is it not so? They flatter themselves that they are much loved.

2. Yes, they have the beauty of youth and they have good health, and every body likes them.

3. Which are the books you bought this morning? I have

been told that you mean to read them and copy portions of them.

4. I did not buy any, but I borrowed two. There they are. One is new, the other old. I like this one, but not that. Which is the better?

5. Are you going to give me one or must I buy it? I know you very well, but do not know what you are going to do.

6. I am afraid that my music-teacher is coming and that I must learn my lesson. No, it is not he. He wears a white silk hat and black gloves.

7. Though you have no experience and are having many difficulties, I do not believe that you are losing courage.

8. This morning it was necessary for her to sew her calico dress which she had torn, and now I must go and take her to her brother's.

9. This is the only bonnet I have. Do you think that my mother wishes me to go to church so dadly dressed?

10. People should go to church to pray and not to show their clothes.

11. My brother and I were going to our uncle's unless it rained. If it rains this evening we shall stay there.

12. Before you start I will give you some stockings. You have no new ones. It is cold weather and you will be cold. This room is cold now.

13. He is a painter. We will make him paint a picture of your library, and you can pay him next week when you receive your money from General B.

14. We shall leave Ithaca at a quarter before seven in the morning, and I must now go to bed for I shall have to rise at ten minutes past six. Good-bye.

Give the 2d pers. plu. of the imp. ind., of the fut., and of the imp. sub. of the following:

aller,	coudre,	dire,	prendre,
acquérir,	ceindre,	faire,	resoudre,
bouillir,	croire,	mettre,	taire.

Translate the following passages from Voltaire's Charles XII, giving the principal parts of the irregular verbs, and parsing such words as are marked.

* * * * * * *

* * * * * * *

German.

I.

Translate:

Der Ritter fuhr in seiner Erzählung fort: "Ich wäre mit meinem scheuen Pferde fast gegen Baumstämme und Aeste angerannt; es triefte vor Angst und Erhitzung, und wollte sich doch noch immer nicht halten lassen. Zuletzt ging es gerade auf einen steinigen Abgrund los; da kam mir's plötzlich vor, als werfe sich ein langer, weisser Mann dem tollen Hengste quer vor in seinem Weg; der entsetzte sich davor und stand; ich kriegte ihn wieder in meine Gewalt, und sah nun erst, dass mein Retter kein weisser Mann war, sondern ein silberheller Bach, der sich neben mir von einem Hügel herunterstürtzte, meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Give the principal parts of *fuhr fort*, *angerannt*, *lassen*, *ging los*, *kam vor*, *werfe*, *entsetzte*, *stand*, *sah*, *herunterstürtzte.*
2. Give synopsis throughout the active and passive, indicative, subjunctive and conditional, third, singular, of *werfen.*
3. Where is *wäre angerannt* found? why subjunctive? Why is *werfe* subjunctive? why present? why not transposed?
4. What kind of subordinate sentence is introduced by *als*, *dass*, *der?*
5. Explain the use of *davor*, *sondern*, *hemmend.*
6. What are the different ways of arranging a German sentence, and when is each order of arrangement used? Illustrate by sentences in this passage.

II.

Translate:

Berglied.

Am Abgrund leitet der schwindlichte S t e g,
Er führt zwischen Leben und Sterben;
Es sperren die Riesen den einsamen Weg
Und drohen dir ewig Verderben;
Und willst du die schlafende Löwin nicht wecken,
So wandle still durch die Strasse der Schrecken.

Es scwebt eine B r ü c k e, hoch über den Rand
Der furchtbaren Tiefe gebogen,

Sie ward nicht erbauet von Menschenhand,
Es hätte sich's keiner verwogen;
Der Strom braust unter ihr spät und früh,
Speit ewig hinauf, und zertrümmert sie nie.

Es öffnet sich schwarz ein schauriges Thor,
Du glaubst dich im Reiche der Schatten,
Da thut sich ein lachend Gelände hervor,
Wo der Herbst und der Frühling sich gatten;
Aus des Lebens Mühen und ewiger Qual
Möcht ich fliehen in dieses glückselige Thal.

1. Give, with the definite article, the nominative singular, genitive singular, and nominative plural of the following nouns: *Riesen, Verderben, Löwin, Rand. Thor, Gelände, Frühling, Thal.*

2. Inflect in German: good man, a good child, the good woman.

3. Tell the derivation of the following words, showing the special meaning of each derivative: *Steg, wecken, Tiefe, Menschen* in *Menschenhand, Gelände, Frühling, glückselige.*

4. Give the English cognates, found by Grimm's Law, in the following words: *leitet, sterben, schwebt, ward, schwarz, Thor, glaubt, thut, Thal.*

III.

Translate into German:

During[1] an overflow[2] of the Adige[3] the bridge[4] of Verona was swept away[5] by the force[6] of the current,[7] but there was left[8] one of the middle[9] arches[10] on which was[11] a house which was inhabited[12] by the tollgatherer[13] with his family.[14] The people[15] gathered[16] on the shore[17] could distinctly[18] hear the shrieks-for-help[19] of the distressed[20] family. The Count[21] of Spolverini, who was in-the-midst-of[22] the crowd,[23] promised[24] the one who would rescue[25] the poor family from sure[26] destruction[27] a reward[28] of five hundred dollars. At-this-moment[29] a young peasant[30] came along,[31] who sprang into a boat[32] and with great exertions[33] succeeded[34] in reaching[35] the house.

1. *bei.* 2. *Ueberscwemmung.* 3. *die Etsch.* 4. *die Brücke.* 5. *hinwegreissen.* 6. *die Gewalt.* 7. *die Fluth.* 8. *stehen.* 9.

mittler. 10. *der Bogen.* 11. *sich befinden.* 12. *bewohnen.* 13. *Zolleinnehmer.* 14. *die Familie.* 15. *das Volk.* 16. *versammeln.* 17. *das Ufer.* 18. *deutlich.* 19. *das Geschrei.* 20. *unglücklich.* 21. *Graf.* 22. *mitten in.* 23. *das Gedränge.* 24. *versprechen.* 25. *erretten.* 26. *sicher.* 27. *Untergang.* 28. *Belohnung.* 29. *da.* 30. *Bauer.* 31. *herbeikommen.* 32. *das Boot.* 33. *Austrengung.* 34. *gelingen.* 35. *erreichen.*

Latin.

Cæsar.

Translate (at sight):

—Hostes postero die multo maioribus coactis copiis castra oppugnant, fossam complent. Eadem ratione qua pridie ab nostris resistitur. Hoc idem reliquis deinceps fit diebus. Nulla pars nocturni temporis ad laborem intermittitur; non aegris, non vulneratis facultas quietis datur. Quaecumque ad proximi diei oppugnationem opus sunt, noctu comparantur. B. G., v, 40.

Give the reason for the cases of *multo*, *copiis*, *temporis;* the principal parts of *resistitur.*

Vergil.

Translate:

"Nate dea vosque haec" inquit "cognoscite, Teucri,
et mihi quae fuerint iuvenali in corpore vires
et qua servetis revocatum a morte Dareta."
dixit et adversi contra stetit ora iuvenci,
qui donum adstabat pugnae, durosque reducta
libravit dextra media inter cornua caestus,
arduus, effractoque inlisit in ossa cerebro.
sternitur exanimisque tremens procumbit humi bos.

—Æn., v, 474–481.

With what meaning is the ablative sometimes possible after *in* denoting motion (compare *ossa*, next to last line). Is this construction a violation of the principles of the language?

Divide the last three verses into feet, and give the so-called "rules" for the length of all final and penultimate syllables in the next to the last line. Is the statement true that "a vowel before two consonants, or a double consonant, is long by position"? Justify your answer. What is the metrical effect of the peculiar ending of the last line?

Translate:

> Incipe Maenalios mecum, mea tibia, versus.
> Mopso Nisa datur: quid non speremus amantes?
> iungentur iam grypes equis, aevoque sequenti
> cum canibus timidi venient ad pocula dammae.
> Mopse, novas incide faces: tibi ducitur uxor;
> sparge, marite, nuces: tibi deserit Hesperus Oetam.
>
> —ECL., viii, 25–30.

Explain the customs alluded to in *incide faces*, *sparge nuces*. How do you account for the use in the Eclogues of Greek scenery and Greek imagery in connection with Roman subjects?

Indicate as well as you can by English spelling how a Roman would have pronounced the next to the last line.

CICERO.

Translate:

Quam ob rem sive hoc statueritis, dederitis mihi comitem ad contionem populo carum atquae iucundum, sive Silani sententiam sequi malueritis, facile me atque vos crudelitatis vituperatione populus Romanus exsolvet; atque obtinebo eam multo leniorem fuisse. Quamquam, patres conscripti, quae potest esse in tanti sceleris immanitate punienda crudelitas? ego enim de meo sensu iudico. Nam ita mihi salva re publica vobiscum perfrui liceat, ut ego, quid in hac causa vehementior sum, non atrocitate animi moveor—quis est enim me mitior?—sed singulari quadam humanitate et misericordia. Videor enim mihi videre hanc urbem, lucem orbis terrarum atque arcem omnium gentium, subito uno incendio concidentem.

—CAT., iv, 6.

Explain distinctly the meaning of the mood and tense of *statueritis*, *iudico*, *liceat*; of the case of *vituperatione*. Give the principal parts of *statueritis*, *malueritis*, *exsolvet*. Compare *facile*. Explain fully the formation of the word *sententia*.

What are the two opinions discussed by Cicero, and who is the representative of the former? What sentence marks the transition from the non-committal "sive—sive" to the urging of Cicero's own view? What was Cicero's position in the state at this time?

Translate (at sight):

Multa praetereo eaque praeclara; ad singulare enim M. Antonii factum festinat oratio. Dictaturam, quae iam vim regiae potestatis obsederat, funditus ex re publica sustulit, de qua ne sententias quidem diximus: scriptum senatus consultum, quod fieri vellet, attulit, quo recitato auctoritatem eius summo studio secuti sumus eique amplissimis verbis per senatus consultum gratias egimus.

Lux quaedam videbatur oblata, non modo regno, quod pertuleramus, sed etiam regni timore sublato, magnumque pignus ab eo rei publicae datum, se liberam civitatem esse velle, cum dictatoris nomen, quod saepe iustum fuisset, propter perpetuae dictaturae recentem memoriam funditus ex re publica sustulisset.

—PHIL., i, 1–2.

What is the meaning of the mood and tense of *vellet*, *velle*, *sustulisset*? Give the synopsis of these verbs in the first person plural active. Explain the case of *quo*, *dictatoris*; the formation of *funditus*.

COMPOSITION.

Translate into Latin:

Had Cicero assented to the opinion of a certain Roman, he would indeed have been saved from unjust charges, but Rome could hardly have escaped. Do you not agree with me that, after the killing of the conspirators, partly at Rome and partly on the field of battle, the condition of the city was much better than if the guilty[1] men had either been forgiven[2] or lightly punished.[3]

[1] Use *noceo*. [2] *Ignosco*. [3] *Poenam ab . . . expetere.*

HISTORY.

Sketch briefly the struggle between Rome and Carthage. Why was it natural that Sicily should be the first place of meeting?

Show the wisdom of Rome's method of dealing with conquered provinces.

Sketch briefly the political activity of Cicero after the assassination of Cæsar.

Greek.

[N.B.—Write the Greek words *with their accents*].

I. Prose.

Translate any *two* of the following three passages (of which it is not supposed that you have previously seen more than one); and answer *all* the questions.

1.

Πεμπόντων δὲ πρέσβεις ἐς Λακεδαίμονα, τῶν μὲν τριάκοντα ἐξ Ἐλευσῖνος, τῶν δ' ἐν καταλόγῳ ἐξ ἄστεος, καὶ βοηθεῖν κελευόντων, ὡς ἀφεστηκότος τοῦ δήμου ἀπὸ Λακεδαιμονίων, Λύσανδρος, λογισάμενος ὅτι οἷόν τε εἴη ταχὺ ἐκπολιορκῆσαι τοὺς ἐν τῷ Πειραιεῖ κατά τε γῆν καὶ κατὰ θάλατταν, εἰ τῶν ἐπιτηδείων ἀποκλεισθείησαν, ξυνέπραξεν ἑκατόν τε τάλαντα αὐτοῖς δανεισθῆναι, καὶ αὐτὸν μὲν κατὰ γῆν ἁρμοστήν, Λίβυν δὲ τὸν ἀδελφὸν ναυαρχοῦντα ἐκπεμφθῆναι. καὶ ἐξελθὼν αὐτὸς μὲν Ἐλευσῖνάδε, ξυνελέγετο ὁπλίτας πολλοὺς Πελοποννησίους· ὁ δὲ ναύαρχος κατὰ θάλατταν ἐφύλαττεν, ὅπως μηδὲν εἰσπλέοι αὐτοῖς τῶν ἐπιτηδείων· ὥστε ταχὺ πάλιν ἐν ἀπορίᾳ ἦσαν οἱ ἐν Πειραιεῖ, οἱ δ' ἐν τῷ ἄστει πάλιν αὖ μέγα ἐφρόνουν ἐπὶ τῷ Λυσάνδρῳ.

—Xen. *Hellenica*, II, iv, 28 (Goodwin's Reader).

Give the principal parts of *πεμπόντων, ἀφεστηκότος, ἐξελθών, ξυνελέγετο, εἰσπλέοι*. Give synopses of *λογισάμενος* and *ἐκπεμφθῆναι*, through all the moods. Inflect *ἐφρόνουν*.

How had "the Thirty" come into power, and by what means were they deposed?

2.

Ἀποκρίνεται ὁ Χειρίσοφος· Βλέψον, ἔφη, πρὸς τὰ ὄρη, καὶ ἰδὲ ὡς ἄβατα πάντα ἐστί· μία δ' αὕτη ὁδὸς ἣν ὁρᾷς *ὀρθία, καὶ ἐπὶ ταύτῃ ἀνθρώπων ὁρᾶν ἔξεστί σοι ὄχλον τοσοῦτον, οἳ κατειληφότες φυλάττουσι τὴν ἔκβασιν. ταῦτ' ἐγὼ ἔσπευδον, καὶ διὰ τοῦτό σε οὐχ ὑπέμενον, εἴ πως δυναίμην φθάσαι πρὶν κατειλῆφθαι τὴν ὑπερβολήν· οἱ δ' ἡγεμόνες οὓς ἔχομεν οὔ φασιν εἶναι ἄλλην ὁδόν. ὁ δὲ Ξενοφῶν λέγει· Ἀλλ' ἐγὼ ἔχω δύο ἄνδρας. ἐπεὶ γὰρ ἡμῖν πράγματα παρεῖχον, ἐνηδρεύσαμεν, ὅπερ ἡμᾶς καὶ ἀναπνεῦσαι ἐποίησε, καὶ ἀπεκτείναμέν τινας αὐτῶν, καὶ ζῶντας προὐθυμήθημεν λαβεῖν αὐτοῦ τούτου ἕνεκα, ὅπως ἡγεμόσιν εἰδόσι τὴν χώραν χρησαίμεθα.*

—Xen. *Anabasis*, IV, I, 20.

Decline *ὄρη* through the singular, and *ἔκβασιν* through the plural. Give the nominative sing. and plur., through all genders, of *ταύτῃ*. Point out the *enclitics* in this passage.

3.

Κῦρος γὰρ μέχρι μὲν δώδεκα ἐτῶν ἢ ὀλίγῳ πλεῖον ταύτῃ τῇ παιδείᾳ ἐπαιδεύθη, καὶ πάντων τῶν ἡλίκων διαφέρων ἐφαίνετο καὶ εἰς τὸ ταχὺ μανθάνειν ἃ δέοι καὶ εἰς τὸ καλῶς καὶ ἀνδρείως ἕκαστα ποιεῖν. ἐκ δὲ τούτου τοῦ χρόνου μετεπέμψατο Ἀστυάγης τὴν ἑαυτοῦ θυγατέρα καὶ τὸν παῖδα αὐτῆς· ἰδεῖν γὰρ ἐπεθύμει, ὅτι ἤκουεν αὐτὸν καλὸν κἀγαθὸν εἶναι. ἔρχεται δ' αὐτή τε ἡ Μανδάνη πρὸς τὸν πατέρα καὶ τὸν Κῦρον τὸν υἱὸν ἔχουσα.

—Xen. *Cyropædia*, I, III, 1.

II. Composition.

[The Greek words may be found in the second prose-passage above.]

The guide said there was no other way out of the country, and if we should not make haste by this, the men would kill some of us.

III. Poetry.

Translate:

Ὢ πόποι! ἦ μέγα πένθος Ἀχαιΐδα γαῖαν ἱκάνει·
ἦ κεν γηθήσαι Πρίαμος, Πριάμοιό τε παῖδες,
ἄλλοι τε Τρῶες μέγα κεν κεχαροίατο θυμῷ,

εἰ σφῶϊν τάδε πάντα πυθοίατο μαρναμένοιϊν,
οἳ περὶ μὲν βουλὴν Δαναῶν, περὶ δ' ἐστὲ μάχεσθαι.
ἀλλὰ πίθεσθ'· ἄμφω δὲ νεωτέρω ἐστὸν ἐμεῖο.
ἤδη γάρ ποτ' ἐγὼ καὶ ἀρείοσιν ἠέπερ ὑμῖν
ἀνδράσιν ὡμίλησα, καὶ οὔποτέ μ' οἵγ' ἀθέριζον.

—*Iliad*, I, 254–261.

Translate:

Ἀλλ' ὅτε δὴ Τρώεσσιν ἐν ἀγρομένοισιν ἔμιχθεν,
στάντων μὲν Μενέλαος ὑπείρεχεν εὐρέας ὤμους,
ἄμφω δ' ἑζομένω, γεραρώτερος ἦεν Ὀδυσσεύς·
ἀλλ ὅτε δὴ μύθους καὶ μήδεα πᾶσιν ὕφαινον,
ἤτοι μὲν Μενέλαος ἐπιτροχάδην ἀγόρευεν,
παῦρα μέν, ἀλλὰ μάλα λιγέως· ἐπεὶ οὐ πολύμυθος,
οὐδ' ἀφαμαρτοεπής, ἢ καὶ γένει ὕστερος ἦεν.
ἀλλ' ὅτε δὴ πολύμητις ἀναΐξειεν Ὀδυσσεύς,
στάσκεν, ὑπαὶ δὲ ἴδεσκε, κατὰ χθονὸς ὄμματα πήξας,
σκῆπτρον δ' οὔτ' ὀπίσω οὔτε προπρηνὲς ἐνώμα,
ἀλλ' ἀστεμφὲς ἔχεσκεν, ἀΐδρεϊ φωτὶ ἐοικώς·
φαίης κε ζάκοτόν τέ τιν' ἔμμεναι, ἄφρονά τ' αὔτως·
ἀλλ' ὅτε δή ῥ' ὄπα τε μεγάλην ἐκ στήθεος ἵει,
καὶ ἔπεα νιφάδεσσιν ἐοικότα χειμερίῃσιν,
οὐκ ἂν ἔπειτ' Ὀδυσῆΐ γ' ἐρίσσειε βροτὸς ἄλλος·
οὐ τότε γ' ὧδ' Ὀδυσῆος ἀγασσάμεθ' εἶδος ἰδόντες.

—*Iliad*, III, 209–224.

Scan the last line of the first passage, marking the quantity of every syllable. Give the Attic equivalents of the following forms: *πυθοίατο, ἔμιχθεν, ὑπείρεχεν.* Where formed (tense, mood, voice), and from what verbs, are *γηθήσαι, κεχαροίατο, ἀγρομένοισιν?*

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J. Kirkland, A.B.
J. A. Rea, A.B.
D. W. Rhodes, A.B.
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E. J. Hadley, B.S.
W. H. Hayes, B.S.
*I. Hoagland, B.S., (Ph.B., '72).
S. F. Huntley, B.S.
K. W. Ingham, Ph.B.
G. W. Ingraham, A.B.
M. Kasson, B.V.S.
R. O. Kellogg, Ph.B.
E. D. Leffingwell, B.S.
J. J. Lockhart, B.S.
J. M. McNair, B.S.
W. S. McGregor, B.S.
J. E. More, A.B.
M. J. Morse, Ph.B.
J. O'Neill, A.B.

E. L. Parker, A.B.
C. E. Reeves, B.S.
F. H. Remington, B.S.
A. J. Rogers, Ph.B.
W. P. Ryman, B.S.
S. W. Salmon, B.C.E.
F. Schoff, B.C.E.
A. H. Sewell, B.S.
H. H. Seymour, B.S.
F. Sherman, B.S.
G.L.T. Smith,B.C.E.,(C.E., '74)
M. A. Smith, B.C.E.
R. G. H. Speed, Ph.B.
R. Taft, B.S.
W. H. Tallmadge, A.B
C. E. Van Cleef, B.S.
W. De L. Wilson, A.B.

Graduated in 1872.

A. M. Baldwin, Ph.B.
M. C. Bean, B.C.E.
C. H. Blair, A.B., (A.M., '76).
D. W. Bowman, B.C.E.
E. L. Brady, B.S.
G. F. Breed, Ph.B.
H. S. Buffum, B.S.
J. M. Chase, B.S.
I. E. Clark, B.C.E.
A. C. Clement, B.S.
A. W. Clinton, B.S.
D. Colburn, B.C.E.
M. T. Conklin, B.S.
*H. E. Copeland, Ph. B., (M.S., '75).
C. L. Crandall,B.C.E.,(C.E.,'76).
C. S. Crofoot, Ph.B.
Gram Curtis, B.C.E.
D. M. Darrin, B.S.
L. A. Foster, B.S.
F. W. Frost, B.C.E.
A. N. Fuller, B.S.
W. Harkins, B.S., (B.Lit., '73).
R. Headly,B.S.
H. C. Henderson, B.C.E.
I. N. L. Heroy, B.S.
W. E. Holcomb, B.S.
F. Holden, A.B.
R. B. Howland, B.C.E.
J. H. Hurd, B.S.
E. W. Hyde, B.C.E., (C.E.'74).
G. A. Iselin, B.S.
D. S. Jordan, M.S.
L. F. Judson, B.S.
M. Kellogg, B.S.
J. B. Lawrence, Ph.D.
W. N. B. Lawton, Ph.B.
W. B. Leach, B.S.
J. W. Mack, B.S.
J. T. McCollum, B.S.
T. J. McConnon, B.S.
E. E. McElroy, B.S.
F. D. Nash, B.S.
E. Nicoll, B.S.
W. H. Niles, B.S.
A. Osborn, A.B.
D. M. Page, B.S.
M. G. Peters, B.S.
A. C. Pike, B.S.
G. W. Pitts, B.S.
*H. G. Pollock, B.S
C. S. Price, B.C.E.
A. L. Rader, Ph.B.
A. Rogers, B.C.E.
D. E. Salmon, B.V.M., (D.V.M. '76).

T. Sanderson, A.B.
W. I. Scott, B.S.
G. P. Serviss, B.S.
C. B. Sill, B.C.E.
*C. Smith, B.S.
L. P. Smith, B.S., (Agr.B.,'74).
M. G. Stolp, B.C.E.
S. P. Thomas, B.C.E.
J. E. Van De Carr, B.S.
J. De W. Warner, Ph.B.
A. C. Weeks, B.S.
S. N. Williams, B.C.E.
E. V. Wilson, B.S.
T. H. Wolford, B.S.
W. J. Youngs, B.S.

Graduated in 1873.

C. F. Allen, B.C.E.
H. Altman, B.S.
R. Anderson, B.M.E.
J. C. Averill, B.S.
A. B. Aubert, B.S.
R. Bacon, B.S.
E. H. Bartley, B.S.
S. F. Belknap, B.S.
H. E. Blake, B.C.E.
L. G. Boies, A.B.
J. W. Boothby, B.S.
S. W. Brown, B.S., (C.E., '76).
Frank D. Carpenter, B.C.E.
F. H. Carver, B.S.
A. B. Cauldwell, B.S.
J. Chamberlin, B.S.
I. P. Church, B.C.E.
J. T. Cothran, A.B.
W. H. Denham, B.S.
O. A. Derby, B.S., (M.S., '74).
G. Devin, B.C.E.
*E. T. Diefendorff, B.S.
E. G. Donaldson, B.Lit.
G. F. Dudley, B.S.
W. F Duncan, B.S.
E. S. Eastman, Ph.B.
L. Elsbree, A.B.
L. Everett, B.S.
J. B. Ewell, B.S.
L. Falkenau, B.C.E., (C.E., '77).
F. B. Ferriss, B.S.
P. D. Finnegan, A.B.
C. Finster, A.B.
N. K. Foster, B.S.
J. Frankenheimer, Ph.B.
*M. R. Frazer, A.B.
A. Gridley, B.S.
F. N. Hagar, A.B.
F. W. Halsey, B.S.
G. W. Harris Ph.B.
A. C. Harwick, B.S.
J. W. Hill, B.M.E.
G. W. Horner, B.C.E.
E. M. Howard, B.S.
A. T. Hyde, B.C.E.
H. C. Johnson, A.B.
*F. H. Jones, B.Lit.
C. S. Joy, A.B.
F. W. Kelley, A.M., (Ph.D.,'74).
W. L. Klein, B.S.
F. J. Knight, B.C.E.
J. M. Knowles, B.S.
*D. E. Kohler, A.B.
C. Y. Lacy, Agr.B.
C. F. Lane, A.B.
D. T. Lawson, B.C.E.
W. Leland, B.S.
C. E. Lipe, B.M.E.

R. H. Lockwood, B.C.E.
G. F. Lyman, B.C.E.
D. W. J. Mesick, B.S.
J. L. Moffatt, B.S.
J. G. Moore, A.B.
G. C. Morehouse, B.S.
W. T. Morris, B.S.
J. G. Newkirk, A.B.
C. D. Page, B.S.
R. Parmely, B.S.
F. Parson, B.C.E.
G. E. Patrick, B.S., (M.S., '74).
G. H. Phelps, BS.
*K. Preston, B.C.E.
F. W. Proctor, B.S.
F. J. Root, B.C.E.
J. R. Schoonover, Arch.B.
E. H. Scofield, A.B.
J. F. Seybolt, B.S.
M. C. Sharp, Ph.B.
M. A. Shotwell, Ph.B.
C. D.W. Smith, B.S., (M.S., '75).
C. L. Smith, B.S.
S. Smith, B.S.
W. H. Smith, A.B.
H. L. Sprague, B.S.
W. L. Sprague, A.B.
H. D. Stevens, B.S.
*G. A. Tilly, B.C.E.
W. Tinning, B.S.
*J. H. Tompkins, B.C.E.
G. B. Turner, B.S.
M. W. Van Auken, A.B.
C. F. Wheelock, B.S.
T. S. White, B.C.E.
T. Worthington, Ph.B.

Graduated in 1874.

F. B. Alexander, B.C.E.
G. Berry, Arch.B., (Arch., '76).
N. W. Cady, Ph.B.
C. W. Candee, B.S.
J. D. Case, B.S.
J. F. Cluck, A.B.
J. H. Comstock, B.S.
F. W. Cooper, Arch.B.
O. H. P. Cornell, C.E.
J. A. Dobroluboff, B.C.E.
W. R. Dudley, B.S., (M.S.,'76).
H. L. R. Fairchild, B.S.
W. R. Fitch, B.C.E.
S. P. Fleming, A.B.
W. H. Flint, A.B.
R. B. Foster, B.C.E., (C.E.,'77).
L. M. Fulton, B.S.
W. Green, B.C.E.
H. M. Gillett, B.S.
T. Hampson, Lit.B.
J. T. Hay, B.S.
B. A. Hayes, Lit. B.
L. F. Henderson, Ph.B.
H. M. Hibbard, B.C.E.
H. L. House, A.B.
J. T. Hurd, B.S.
W. H. Janney, B.C.E.
E. F. P. Jordao, B.C.E.
W. A. Kellerman, B.S.
H. M. Kennedy, Lit.B.
B. W. Law, Arch.B.
C. H. Lay, B.C.E.
W. R. Lazenby, Agr.B.
H. G. Northrup, B.C.E.
J. H. Peirce, B.S.
E. M. Pitts, B.S., (M.S., '75).
C. A. Preston, B.S.
C. H. Ramsay, B.S.

E. O. Randall, Ph.B.
W. M. J. Rice, Arch.B.
H. B. Robinson, B.C.E.
B. E. Shear, Arch.B.
G. S. Sheppard, B.S.
W. M. Smith, B.S.
W. N. Smith, B.M.E.
C. W. Soulby, B.S.
J. H. Southard, B.S.
A. C. Standart, B.S.
J. L. Stone, Agr.B.
W. Swaty, B.S.
W. P. Thompson, B.S.
L. P. Tier, B.C.E.
S. E. Todd, Arch.B.
F. C. Tomlinson, B.C.E.
G. B. Upham, B.S.
J. D. Upham, B.S.
M. Van Cleef, B.S.
G. R. Van De Water, B.S.
F. W. Warthorst, B.C.E.
C. W. Wasson, B.C.E.
R. H. Wiles, B.S.
G. T. Winston, Lit.B.
C. C. Wood, B.S.
F. C. Wood, B.S.

Graduated in 1875.

W. O. Bates, Ph.B.
A. A. Beattie, B.M.E.
H. P. Bellows, B.S., (M.S., '79).
E. T. Betts, B.S.
A. R. Bradford, B.S.
A. W. Bulkley, Arch.B.
S. J. Bunting, B.M.E.
C. F. Burt, B.S.
S. W. Carpenter, Ph.B.
I. N. Cook, B.C.E.
E. R. Corson, B.S.
V. L. Davy, A.B.
J. W. Dean, B.S.
O. W. Ferguson, B.C.E.
G. H. Fitch, B.S.
E. L. B. Gardiner, B.M.E.
E. George, B.C.E.
A. R. Gillis, B.M.E.
A. C. Greene, B.C.E.
C. S. Harmon, B.S.
O. Harris, B.S.
F. Hatch, A.B.
F. H. Hiscock, A.B.
D. R. Horton, B.S.
I. E. Hutton, Arch.B.
E. Jackson, B.S.
C. C. King, Arch.B.
H. B. Knight, A.B.
M. H. Ladd, A.B.
M. D. Makepeace, B.C.E.
G. S. Moler, B.M.E.
J. T. Newman, Ph.B.
E. L. Nichols, B.S.
P. H. Perkins, B.C.E.
E. D. Preston, B.C.E., (C.E., '80).
E. J. Preston, B.S.
H. H. Roberts, Ph.B.
E. K. Rossiter, Arch.B.
H. W. Sackett, A.B.
A. F. Shaw, B.S.
F. W. Simonds, B.S., (M.S., '76).
F. P. Smith, B.S.
F. P. Stevens, B.S.
W. M. Sturges, Agr.B.
G. Tatnall, B.C.E.
J. J. Thomas, A.B., (A.M., '76).
G. R. Thompson, B.S.
W. J. Thompson, B.S.

D. J. Tompkins, Ph.B.
V. S. Walsh, B.S.
F. P. Wheeler, B.S.
J. G. Worthington, A.B.

Graduated in 1876.

J. M. Ashley, B.S.
C. P. Aylen, B.C.E.
C. Barclay, B.S.
C. P. de Barros, B.C.E.
W. J. Berry, A.B.
G. Boardman, B.M.E.
C. T. Brewer, Ph.B.
J. T. Brown, B.M.E.
F. de A. V. Bueno, B.C.E.
J. K. Cady, Arch.B.
C. F. Carpenter, B.M.E.
E. F. Church, B.M.E.
M. R. Conable, B.C.E.
C. B. Coon, B.S.
S. H. Coon, A.B.
E. L. Crandall, B.S.
S. S. Eddy, B.S.
*A. F. Eidlitz, B.C.E.
C. H. Esty, A.B.
W. F. Farmer, B.C.E.
D. F. Flannery, B.S.
E. Frayer, A.B., (A.M., '77).
M. M. Garver, B.S.
H. McC. Hadley, Arch.B.
F. E. Heath, B.S.
A. Z. Kent, B.M.E.
W. H. Kent, B.S., (M.S., '80).
F. Looney, B.S.
A. E. Maltby, B.C.E.
W. G. McDowell, A.B.
J. C. McMullen, B.C.E.
R. L. Moore, B.S.
F. W. Noyes, Ph.B.
L. B. Palmer, B.S.
W. H. Parker, Arch.B.
C. R. Parkhurst, B.S.
J. Parmelee, B.S.
C. W. Raymond, B.C.E.
H. J. Rice, B.S., (M.S., '80).
W. K. Roy, B.S.
H. A. Rueppele, B.S.
H. Russel, A.B., (Arch.B., '77)
C. F. Saunders, Arch.B.
H. B. Seeley, Arch.B.
T. Stanton, A.B., (A.M., '77).
J. H. Stubbs, B.C.E.
J. W. Sturdevant, B.S.
S. P. Sturges, A.B.
W. P. Sturges, B.S.
J. B. Tarleton, Arch.B.
*F. E. Taylor, B.M.E.
H. Terry, B.S.
E. D. Thompson, B.C.E.
H. C. Tilden, B.Lit.
C. A. Van Velzer, B.S.
E. A. Wagner, B.S.
C. E. Washburne, Ph.B.
C. B. Wheelock, B.C.E.
C. H. Willmarth, Agr.B., (M.S., '77).
C. P. Woodruff, B.S.
R. Yatabe, B.S.
F. O. Young, B.S.

Graduated in 1877.

W. C. Ames, B.C.E.
J. Aylen, B.C.E.
A. F. Balch, Arch.B.
C. M. Bean, Agr.B.
J. B. Beatty, B.S.
W. E. Bramhall, B.C.E.
Ida Bruce, A.B.
A. S. Carman, B.S.
P. D. Clark, Ph.B.
C. S. Cobb, B.S.
C. M. Cooper, B.S.
J. S. Coon, B.M.E.
F. D. Crim, B.S.
W. L. Deming, Arch.B.
W. E. Dennis, B.S.
W. R. Dobbyn, Lit.B.
L. Eidlitz, B.M.E.
H. W. Foster, A.B.
A. E. Frota, B.C.E.
S. H. Gage, B.S.
W. Gentleman, B.S.
W. S. Gifford, B.S.
G. W. Gillett, Ph.B.
B. H. Grove, A.B.
M. E. Haviland, B.S.
F. B. Hine, B.S.
L. O. Howard, B.S.
D. W. King, Arch.B.
W. E. Lape, B.M.E.
A. J. Loos, B.S.
W. E. Lucas, Ph.B.
D. J. Macpherson, B.C.E.
C. B. Mandeville, B.S.
L. M. Mann, B.C.E.
A. B. McNairy, B.M.E.
T. L. Mead, B.C.E.
J. S. Milford, B.S.
D. C. Moraes, B.C.E.
C. T. Mould, Arch.B.
I. H. Myers, B.S.
E. O'Niel, Ph.B.
J. N. Ostrom, B.C.E.
F. Outerbridge, B.M.E.
E. H. Palmer, B.S.
F. Patrick, Ph.B.
T. B. Peck, Arch.B.
F. M. Pennock, Agr.B.
F. V. D. Sanford, B.S.
E. J. Sellew, A.B.
E. D. Sherman, B.S.
W. J. Sherman, B.C.E.
M. J. Sinton, B.S.
E. R. Smith, B.C.E.
S. M'K. Smith, Ph.B.
J. C. H. Stevenson, Ph.B.
H. Thomas, B.C.E.
M. C. Thomas, A.B.
W. B. Throop, B.C.E.
A. S. Tibbets, B.C.E.
H. H. Tyndale, B.S.
E. M. Van Dusen, Lit.B.
D. F. Van Vleet, B.S.
J. Viegas-Munis, B.C.E.
A. L. K. Volkmann, Arch.B., (A.B. '80).
L. E. Ware, B.M.E.
J. S. Waterman, B.M.E.
F. P. Weeks, B.S.
H. S. White, B.S.
C. F. Wilson, Ph.B.

Graduated in 1878.

C. W. Ames, Lit.B.
J. W. Babcock, A.B.
E. Baker, B.S.
F. Baker, B.S.
A. H. Ballard, B.S.
S. T. Ballard, B.S.
P. Barnard, B.S.
W. Beahan, B.C.E.
A. E. Beardsley, B.S.
F. E. Bissell, B.C.E., (C.E.,'79).
J. M. Borden, B.M.E.
F. Bruen, B.C.E.
E. Burdsall, B.M.E.
D. W. Cady, A.B.
E. Carey, B.S.
H. Conant, B.S.
C. Crandall, B.S.
S. G. Dewsnap, B.S.
B. B. DeWitt, A.B.
J. Dyson, B.C.E.
G. P. Eaton, B.S.
C. B. Everson, B.S.
A. Falkenau, B.C.E.
L. J. Giddings, B.S.
E. Green, Arch.B.
F. A. Halsey, B.M.E.
E. Hayes, B.C.E.
F. Heermans, B.M.E.
M. Hicks, A.B., (Arch.B., '80).
J. T. Hill, B.M.E.
G. M. Jarvis, B.C.E.
B. Johnson, B.M.E.
L. F. Jones, B.S.
W. Keith, B.S.
F. M. Kendall, B.S.
J. S. Lehmaier, Ph.B.
F. W. Mann, B.S.
C. D. Marx, B.C.E.
F. A. Maxwell, B.C.E., (C.E., '79).
C. H. McCormick, B.C.E.
K. McEbright, A.B.
W. L. McBay, A.B.
F. O. Meeker, B.S.
T. D. Merrill, B.C.E.
J. Ness, B.S.
M. E. Oliver, Ph.B.
W. B. Pattin, B.S.
W. P. Pickett, B.S.
B. de A. Prado, Agr.B.
E. L. Preston, B.C.E.
R. Putnam, Lit.B.
A. M. Reeves, B.S.
C. M. Rexford, A.B.
Q. N. Ribiero, Arch.B.
F. V. Rodriguez, B.C.E.
W. K. Seaman, B.M.E.
E. H. Sellers, A.B.
A. W. Smith, B.M.E.
C. S. Thacher, B.C.E.
R. H. Treman, B.M.E.
H. J. Van Norman, B.S.
A. C. de Vasconcellos, B.M.E.
A. C. Wakeley, Lit.B.
W. Weed, B.S.
P. A. Welker, B.C.E.
W. J. Wilcox, B.M.E.

Graduated in 1879.

W. M. Alberti, B.S.
C. N. Blowers, B.S.
E. W. Bradford, B.S.
A. Buchman, Arch.B.

A. Cane, A.B.
W. Chandler, B.S.
M. F. Conde, Lit.B.
G. A. Dounce, A.B.
W. S. Edwards, B.S.
A. M. Farrington, B.V.S.
N. E. Ferguson, B.C.E.
A. Fleischman, Arch.B.
S. J. Gibson, B.S.
H. Gifford, B.S.
H. L. Green, B.S.
J. A. Haight, A.B.
E. E. Haskell, B.C.E.
A. S. Hathaway, B.S.
R. Herman, B.C.E.
L. L. Hill, B.S.
V. N. Hostetler, B.S.
E. C. Howland, Lit.B.
W. A. Ingalls, B.S.
C. C. Jackson, B.S.
J. C. Kennedy, B.C.E.
R. S. Kent, B.S.
W. C. Kerr, B.M.E.
N. Kozima, Arch.B.
John Lewis, B.M.E.
C. O. Lucas, B.S.
E. B. Macy, B.S.
E. Magner, B S.
H. Marx, B.M.E.
C. V. Mersereau, B.C.E.
A. Millard, B.S.
H. M. Mills, Lit.B.
E. J. Moffat, Lit.B.
D. E. Morris, A.B.
E. R. Morse, B.S.
W. Newton, B.S.
W. Olney, B.C.E.
R. A. Parke, B.M.E., (C.E.,'79).
E. M. Patten, Lit.B.
W. B. Philipp, B.S.
M. M. Pitcher, A.B.
L. H. Porter, B.S.
E. C. Russel, A.B.
S. J. Russel, Lit.B.
C. Ryder, B.S.
F. H. Severance, B.S.
S. A. Simons, A.B.
G. F. Simpson, B.C.E.
F. W. Skinner, B.C.E.
F. E. Smith, B.S.
W. J. Smith, B.C.E.
M. J. Spaulding, B.S.
J. P. Tibiriça, B.M.E.
C. Tomkins, B.S.
J. W. Warner, B.S.
A. Washburn, B.S.
A. Weed, B.C.E.
M. E. Weed, Lit.B.
J. H. Weinmann, B.S
G. M. Welles, B.S.
J. A. Woodward, B.S.
F. A. Wright, Arch.B.
J. H. W. Young, B.S.

Graduated in 1880.

C. R. Allison, B.S.
C. E. Atwood, B.S.
W. A. Baker, B.S.
J. D. Beckwith, B.S.
E. C. Bissell, B.S.
W. B. Breed, B.S.
W. Bronk, A.B.
H. A. Buck, B.S.
C. R. Carpenter, B.S.
G. D. Clements, B.S.

H. A. Cramphin, B.S.
F. S. Curtis, B. S.
E. W. Curtiss, B.M.E.
A. L. Ewing, B.S.
W. A. Finch, A.B.
F. E. Fischel, Lit.B.
G. F. Gifford, B.S.
D. W. Goodwin, B.S.
R. P. Green, B.C.E.
J. A. Hamilton, B.S.
R. W. Havens, B.C.E.
R. P. Hayes, B.S.
W. A. Henry, Agr.B.
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